EFFECTS OF LEADERSHIP BEHAVIOUR, TEACHER EFFECTIVENESS AND HOME ENVIRONMENT ON THE PERFORMANCE OF STUDENTS IN MATHEMATICS IN SECONDARY SCHOOLS

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Abstract

For the success of Indian educational System, it is important to understand the influence of child's surroundings during his journey to attain quality education. A child remains in deep influence of his/her school principal, teachers and home-environment. If we look into the scenario of Indian education system, we find that school environment and home environment normally are two different spheres of his/ her daily life. Presently, lots of efforts are being made to educate parents regarding continuing education at home as child spends maximum time with his parents as well as various steps are taken by Indian government to make school environment conducive to overall development of a child. With these views in mind, the present study was undertaken to assess the impact of leadership behaviour, teacher effectiveness and home environment on the performance of students. For this purpose, a total of 50 senior secondary schools were randomly selected. The sample was collected from government and private schools of rural and urban areas of NOIDA and Greater NOIDA. The sample consisted of 50 principals, 50 teachers and 500 students. The findings revealed that the variables like home environment, teacher effectiveness and leadership behaviour are related to students' performance in mathematics. Home environment plays very important role on the performance of students. Teacher effectiveness is the secondary factor and leadership behaviour is the third factor on the performance of students in mathematics. Educational implications, suggestions and limitations are also discussed.

Keywords: Indian educational system, quality education, home environment, school environment, leadership behaviour, teacher effectiveness, performance of students

Introduction

Mathematics has now become a compulsory subject up to class tenth in our school curriculum because of its multi factorious values to the individual as well as the society. But it is generally observed that mathematics is not favourite subject of the students. There could be so many factors responsible for it. Some of them are leadership behaviour, teacher-effectiveness and home-environment which are responsible for the performance of students in mathematics.

In a democratic country like India, people elect their representative through Parliamentary democracy and these elected representatives choose their leaders. Leaders with their visionary capabilities and administrative abilities harness the resources of his people, country wealth and natural resources for uplifting of his fellow citizens. Leadership is applicable in all walks of life and occupies an important place in any kind of the group. Principal of a school is the leader of the institution and he is considered to be the centre of all the activities of that institution. He is the chief administrative leader in a school system and he is considered to be the executive officer of an administrative unit. Principal as a leader concerns goal setting and tries to achieve shared goals and aims of education.

In the Education system, teachers play an important role in Nation Building. The backbone of any developing nation is the sound educational system and the teacher is considered as a pivot around which the entire success or failure of any educational system revolves. Education is basically a man making process and it implies practicing and ensuring transmission of the human stuff at various levels of socialization, awareness and divine realization. This process of transformation gets stimulated with the help and support of a teacher for whom Indian coinage "Guru" provide the best of meanings.

For the success of Indian Educational System, it is important to understand influence of child's surrounding during his journey to attain quality education. A child remains in deep influence of his school principals, teachers and home-environment. If we look to the scenario of Indian Education, we find that school environment and home environment normally are two different spheres of his/ her daily life. Presently, lots of efforts is being made to educate parents regarding continuing education at home as child spends maximum time with his parents.

Therefore, effects of leadership behaviour, teacher effectiveness and home environment play a very vital role in the performance of students in mathematics. Keeping above said benefits in mind, the present study was conducted to assess the effects of leadership behaviour, teacher effectiveness and home environment on the performance of students.

Literature Review

Several studies have been conducted to have an indepth understanding of the effects of leadership behaviour, teacher effectiveness and home environment on the performance of students in mathematics in Secondary Schools.

Surapuramath (2010) conducted a study on leadership behaviour of heads of secondary school and academic achievement of students in mathematics. The major findings of the study were:

   a. The aided school heads leadership behaviour are better than government school heads leadership behaviour and the unaided schools heads leadership behaviour is better than government school head leadership behaviour.

b. The aided school academic achievement of the 9th standard student in mathematic is better than government school and the unaided school academic achievement of 9th standard student in mathematics is better than government school.

c. Urban school academic achievement of 9th standard student in mathematics is better than rural school and the academic achievement of 9th standard girl's students in mathematics better than boys.

Cunningham (2008) conducted a study on the Relationship between servants – leadership behaviour of the elementary school principal, school climate and student achievement. The population of this study consisted of 206 randomly selected teachers from 27 elementary schools in Michigan. The results indicated a small and weak negative relationship between the servant leadership behaviour of elementary school principals and health of the school climate, a small or weak negative relationship between the health of the school, the independent variables of the socio-economic status, school population size and community degree completion percentage and the dependent variable student achievement. The results of the study also indicated that there is no relationship between independent variable of servant leadership behaviour, school climate, socio-economic status, school's population size and community degree completion percentage. There is also not enough statistical evidence to predict a relationship between the secondary independent variables (socio-economic status and community degree completion percentage) and the health of the school climate. There is however statistical evidence to demonstrate a relationship between school population size and health of the school.

Mishra (1999) conducted study on teacher effectiveness of elementary school teachers in relation to their attitude towards teaching, level of aspiration and job satisfaction. It was observed that there existed a significant positive correlation between teacher effectiveness and job satisfaction. Further, he established a two factor interactional effect in teacher's attitude towards teaching and low job satisfaction. Results showed that teachers with high attitude towards teaching and low job satisfaction showed highest mean teacher effectiveness score, whereas, teachers with low attitude towards teaching and low job satisfaction showed lowest mean teacher effectiveness score.

Chopra, (1982) conducted a study of the organizational climate of school in relation to job satisfaction of Teachers and students' achievement .The sample for the study included 272 teachers and 620 students of eighteen randomly selected schools. The main findings were:

a. Among the six climates, the open climate schools showed the highest overall teacher job satisfaction, followed by the autonomous familiar, controlled, closed and parental climate schools, respectively.

b.   Overall job satisfaction of the teachers in the open climate schools was significantly different from that of the teachers in the closed and parental climate schools at 0.05 level.

c.   There was no significant relationship between teachers' job satisfaction and student achievement.

Pandey and Ahmad (2008) investigated to find out significance of difference among male and female adolescent motivation, intelligence and socio-economic status. Researchers found that there is no significant difference between male and female adolescents on the measures of academic performance, achievement motion, intelligence and socio-economic status.

Nigam and Devi (2007) conducted a study on academic achievement of eleventh grades in relation to their styles of learning, thinking and social environment. He showed that those who preferred both the right as well as left hemisphere in learning and thinking style, their academic achievement was significantly higher than those who preferred one of the two hemispheres. Significant differentials were also found in the academic achievement of students having high and low scores of creative stimulation, cognitive encouragement and permissive components of school environment.

Ahuja and Goyal (2006) investigated to find out subject wise achievement of adolescents in relation to parental involvement and parental aspirations. He concluded that high parental involvement led to higher achievement of adolescents in Science, English and Mathematics as compared to that of the group belonging to parents having low involvement with their ward's academics.

Abduliahi and Onasanya (2010) conducted a study to assess the effects of teacher effectiveness on students' achievement in Mathematics. About 750 senior secondary school students were selected by the satisfied and simple random sampling techniques. The main findings were:

a.   There is no significant difference among the urban, semi-urban and rural areas of Kwara State secondary school student's perceived teacher effectiveness.

b.   There is no significant relationship between Kwara state secondary school students' perceived teacher's effectiveness and their achievement in mathematics.

Lalithamma (1975) conducted a study on factors affecting achievement of secondary school pupils in mathematics. The study was conducted on 732 pupils of standard-IX selected on a stratified random basis. The study revealed that:

a.   The average performance of pupils in math was 24.14 with S.D. of 8.20 and the distribution was negatively skewed.

b.   There was significant difference in the performance of boys and girls in math.

c.   The urban pupils were superior to rural pupils in math.

d. The achievement in math was positively related to intelligence, interest in math, study habits and socio-economic status.

Objectives of the Study

Following objectives were formulated

Primary Objectives

a. To study the impact/effect of leadership behaviour of the principals on the performance of students in mathematics

b. To study the effect/impact of teacher effectiveness on students' performance in mathematics

c. To determine the effect of home – environment on students' performance in mathematics

d. To determine the interactional effect of leadership behaviour of the principals, teachers' effectiveness and home environment of the students on the performance of students in mathematics in secondary schools

Secondary Objectives

a. To compare the impact of leader's gender on students' performance.

b. To compare the students' performance with respect to principals of Government schools and Private schools.

c. To compare the students' performance with respect to principals of schools in urban area and principals of schools in rural area.

d. To compare the students' performance with respect to principals of co-educational, boys' only and girls' only schools.

e. To compare the teacher effectiveness of government schools' teachers and private schools' teachers with reference to students' performance.

f. To compare the effectiveness of teachers in urban area and teachers in rural area with reference to students' performance.

g. To compare the students' performance with respect to teachers of co-educational, Boys' only and Girls' only schools.

Hypotheses

In order to meet out the objectives of present study, following hypotheses were formulated:

Ho_1 There will be no significant impact of leadership behaviour on students' performance in mathematics

Ho_2 There will be no significant impact of teacher effectiveness on students' performance in mathematics

Ho_3 There will be no significant impact of home-environment on students' performance in mathematics

Ho$_4$ There will be no significant interactional effect of leadership behaviour of principals, teachers' effectiveness and home-environment on students' performance in mathematics.

Ho$_5$ There will be no significant difference on account of the impact of leader gender on students' performance.

Ho$_6$ There will be no significant difference between the students' performance with respect to principals of government schools and private schools.

Ho$_7$ There will be no significant difference between the students' performance with respect to principals of schools in urban area and principals of schools in rural area.

Ho$_8$ There will be no significant different impact on students' performance on mathematics with respect to co-educational, boys' only and girls' only schools.

Ho$_9$ There will be no significant difference on account of the impact of teacher gender on students' performance.

Ho$_{10}$ There will be no significant difference between the teacher effectiveness of teachers of government schools and private schools with reference to students' performance.

Ho$_{11}$ There will be no significant   difference between the effectiveness of teachers in urban area and teachers in rural area with reference to students' performance.

Ho$_{12}$ There will be no significant difference among the students' performance with respect to teachers of co-educational, boys' only and girls' only schools.

Research Methodology

Sample of the Study

Population of the study consisted of principals, teachers and students of all senior secondary schools from the province of Uttar Pradesh (U.P). NOIDA and Greater NOIDA, the two cities of Gautam Buddh Nagar districts being the industrial cities are selected for this study. The sample was collected from government and private schools of rural and urban areas of NOIDA and Greater NOIDA. For present study, a total of 50 senior secondary schools were randomly selected. The collection of data from each school comprises:

a. Data from school principals;

b. Data from teachers of mathematics of that school;

c. Students of 8th to 12th standards selected randomly from different school.

Ten students were selected per school using systematic random sampling technique. For this purpose their attendance register was taken as reference point. The researcher assumed that the responses from principals, teachers, and students were truthful and unbiased. Distribution of sample is presented in Table 1.

Table 1

Distribution of Sample according to Urban and Rural Areas

	Urban Area(24)		Rural Area (26)		Total
	Govt. School	Private School	Govt. School	Private School	
Principal	11	13	7	19	50
Teacher	11	13	7	19	50
Students	110	130	70	190	500

Description of the Tools

Leadership Behaviour Scale

Leader behavior scale (Hingar, 1986) is used to measure various dimensions of leader's behavior effectiveness focusing on the 6 dimensions viz emotional stabilizer, team builder, performance orientor, potential extractor, socially intelligent and value inculcator. The scale has 30 items rated on 6-point Likert scale (1=never to 6=always). Out of 30 items 24 items are positive and 6 items are negative.

Teacher Effectiveness Scale

The Teacher Effectiveness (TES) in its final form consists of 69 highly discriminating items (Kumar and Mutha, 1974). The present Likert type scale has been developed to provide a handy instrument for identifying effective / ineffective teachers both for applied and research objectives. . Five alternatives items are given a score of "5", "4", "3", "2" and "1" for "strongly agree", "agree", "undecided", "disagree" and "strongly disagree" respectively.

Home Environment

A Scale "Home Environment Inventory (HEI)" developed by Mishra was used to measure the psycho-social climate of home as perceived by children. It is a five point Likert Scale (1 – never to 5- mostly). It has 100 items belonging to ten dimensions of home environment.

Students' Performance

The unit test marks of all the students, those who fill the questionnaire were given by the mathematics teacher to the investigator. Since these marks obtained were taken as their students' performance, so no other scoring was required.

Statistical Techniques Used

Scientific analysis is possible only with the use of some sort of statistical processing. The acceptance and rejection of hypothesis will ultimately determine the contribution of the investigation in the development of a particular area. This is true for statistical techniques used in the analysis and interpretation of data. Analysis of data for the present study was done using SPSS

21.0. Correlation Analysis, Regression Analysis, Z Test, Descriptive Statistics and Analysis of Variance were used for the analysis of data.

Data Analysis and Findings

Effect of Leadership Behaviour on Students' Performance

Pearson's coefficient of correlation was used to observe relationship between leadership behaviour and students' performance in mathematics. Table 2 suggested a significant positive correlation ($r = 0.431$, $p<0.01$) between leadership behaviour and students' performance. Though this correlation is not very strong but still it gives an idea that school principals play an important role in the academic achievement of students.

Table 2
Correlation between Leadership Behaviour, Teacher Effectiveness, Home Environment and Students' performance in Mathematics

		Students' Performance	Leadership Behaviour	Home Environment	Teacher Effectiveness
Performance of student in mathematics	R	1			
	Sig.				
Leadership Behaviour	R	.431**	1		
	Sig.	.000			
Total Score of Home Environment	R	.665**	.163**	1	
	Sig.	.000	.000		
Teacher Effectiveness	R	.509**	.745**	.265**	1
	Sig.	.000	.000	.000	

To advance the relationship between leadership behaviour and students' performance one-way ANOVA was conducted (Table 3). Results of ANOVA signifies that there is a significant difference between the performance of students i.e. one – way, between – performance analysis of variance revealed a reliable effect of leadership behaviour on students' performance ($F = 42.264$, $p<0.05$) (Table 3).

Results of table 4 for one – way ANOVA suggest that there is a significant difference ($F = 24.390$, $p < 0.05$) between impacts of principals' gender on students' performance in mathematics. Mean Scores of performance from table 5support the fact that female principals (mean score 7.5437, $p < 0.05$) are more effective as compared to male principals (mean score 6.6676).

Table 3
ANOVA table for the Comparison of Mean Scores of Leadership Behaviour for the impact on Students' Performance

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	259.986	2	129.993	42.264	.000
Within Groups	1528.662	497	3.076		
Total	1788.648	499			

Table 4
One – Way ANOVA for Test of Between – Subjects (Leader Gender) Effects

Source	Sum of Squares	df	Mean Square	F	Sig.
Leadergender	83.510	1	83.510	24.390	.000
Error	1705.138	48	3.424		
Total	25926.000	50			

a. R Squared = .047 (Adjusted R Squared = .045)

Table 5
Descriptive Statistics for Leader Gender

Leader gender	Mean	Std. Deviation	N
Male	6.6676	1.94727	340
Female	7.5437	1.62468	160
Total	6.9480	1.89327	500

From the findings of Tables 3, 4 and 5, it could be concluded that the hypothesis H_5 i.e .there will be no significant difference between the impacts of leader gender on students' performance, is rejected.

One – way ANOVA used for the comparison of students' performance with regard to association of principals with government or private schools revealed a significant difference (F = 9.579, p < 0.05) between the students' performance (Table 6).

Table 6
One – way ANOVA for tests of Comparison of Students' Performance with respect to Principals of Government School and Principals of Private Schools

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	33.757	1	33.757	9.579	.002
Within Groups	1754.891	498	3.524		
Total	1788.648	499			

A look into of mean scores suggested that principals of government schools (mean score 7.2944) have more effect on students' performance than the principals of private schools (mean score 6.7531) (Table 7).

Table 7
Descriptive Scores for Comparison of Students' Performance with respect to Principals of Government School and Principals of Private Schools

	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Government	18	7.2944	1.67698	.12499	2.00	10.00
Private	32	6.7531	1.98070	.11072	2.00	10.00
Total	50	6.9480	1.89327	.08467	2.00	10.00

Analysis of results for table 6 and 7 helped in concluding that hypothesis H_6 i.e. there will be no significant difference between the students' performance with respect to the principals of government schools and private schools, is rejected and hence secondary objective 2 is achieved

Table 8
t – test for Equality of Means Students' Performance with respect to Principals of Schools in Urban Area and Principals of Schools in Rural Area

	t	Df	sig.
Performance of Students in Mathematics	1.626	498	.105

Using t – test, students' performance was compared with reference to principals of schools in urban Area and principals of schools in rural area. t – Test values were not significant (t = 1.626, p > 0.05) (Table 8). This suggested that there is no statistically significant difference between students' performance with reference to principals of schools in urban Area and principals of schools in rural area. In the light of above discussion the hypothesis H_7, there will be no significant difference between the students' performance   with respect to principals of schools in urban area and principals of schools in rural area, is accepted.

Table 9
One – way ANOVA table for Comparison of Students' Performance with respect to Principals of Coeducational, Boys' Only and Girls' Only Schools

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	85.719	2	42.859	12.509	.000
Within Groups	1702.929	498	3.426		
Total	1788.648	499			

One – way ANOVA analysis for the comparison of students' performance with respect Principals of Coeducational, Boys' Only and Girls' Only Schools revealed a statistically significant difference (F = 12.509, p<0.05) i.e. one – way, between – performance analysis of variance revealed a reliable effect of principals of Coeducational, Boys' Only and Girls' Only Schools on students' performance (Table 9). Tukey's Post – Hoc test helped in further in-depth analysis. Table 10 summarizes the results of Tukey's Post – Hoc test.

Table 10

Tukey's Post Hoc Test for Comparison of Students' Performance with respect to Principals of Coeducational, Boys' Only and Girls' Only Schools

(I) School type Boys only, girls only and co-education	(J) School type Boys only, girls only and co-education	Mean Difference (I-J)	Std. Error	Sig.
Boys only	Girls only	-1.15500*	.31158	.001
	Co-education	-.22848	.28091	.695
Girls only	Boys only	1.15500*	.31158	.001
	Co-education	.92652*	.19732	.000
Co-education	Boys only	.22848	.28091	.695
	Girls only	-.92652*	.19732	.000

Results of Post – Hoc test suggested that there is a statistically significant difference between the performance of boys' only and girls' only schools ($p < 0.05$), however, no such significant difference was found among students of boys' only and co – educational schools ($p > 0.05$). Principals of girls' only schools were found to be significantly difference from boys' only and co – educational schools.

Table 11
Mean Scores of Students' Performance with respect to Principals of Coeducational, Boys' Only and Girls' Only Schools

	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Boys only	5	6.5200	1.97164	.27883	2.00	10.00
Girls only	12	7.6750	1.42110	.12973	2.00	10.00
Co-education	33	6.7485	1.96638	.10825	2.00	10.00
Total	50	6.9480	1.89327	.08467	2.00	10.00

Mean scores of principals from girls' only schools are more than the principals of boys' only and co – educational schools. This suggested that principals of girls' only schools are better than the principals of boys' only and co – educational schools (Table 11). Thus the hypothesis H_8, i.e. there will be no significant difference impact on students' performance on mathematics with respect to co-educational, boys' only and girls', only, is rejected.

Effect of Teachers on Students' Performance

To assess the effect of teachers on students' performance one – way ANOVA was applied. Table 12 shows the main ANOVA summary table.

Table 12
One – way ANOVA for Tests of Between – Subjects (Teacher Effectiveness) Effects

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	523.292	4	130.823	51.177	.000
Within Groups	1265.356	495	2.556		
Total	1788.648	499			

From table it is clear that there is a statistically significant difference in the students' performance in mathematics among the different level of teacher effectiveness (F = 51.177, p < 0.05). Performance of students was compared with regard to teacher gender using t – test

Table 13
t – test for Equality of Means with regard to Teacher Gender

	t	df	sig.
Performance of Students in Mathematics	- 0.186	498	0.851

From table 13, it is evident that there is no statistically significant difference (p>0.05) in performance of students with respect to male teachers and female teachers i.e. teacher gender is not a predictor of students' performance. Thus the hypothesis H_9, there will be no   significant difference between impacts of teacher gender on students' performance, is accepted.

One – way ANOVA used for the comparison of students' performance with regard to association of teachers with government or private schools revealed a significant difference (F = 9.579, p < 0.05) between the students' performance (Table 14).

Analysis of results from tables 14 helped in concluding that hypothesis H_{10} i.e. there will be no significant difference between the teacher effectiveness of teachers of government schools and private schools,   with reference to students' performance, is rejected.

Using t – test students' performance was compared with reference to teachers of schools in urban area and teachers of schools in rural area.

Table 14
One – way ANOVA for tests of Comparison of Students' Performance with respect to Teachers of Government School and Teachers of Private Schools

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	33.757	1	33.757	9.579	.002
Within Groups	1754.891	498	3.524		
Total	1788.648	499			

Table 15

t – test for Equality of Means Students' Performance with respect to Teachers of Schools in Urban Area and Teachers of Schools in Rural Area

	t-score	df	sig.
Performance of Students in Mathematics	1.626	498	.105

t – Test values were not significant (t = 1.626, p > 0.05) (Table 15). This suggested that there is no statistically significant difference between students' performance with reference to teachers of schools in urban area and teachers of schools in rural area. In the light of above discussion the hypothesis H$_{11}$, there will be no significant difference between the effectiveness of teachers in urban areas and teachers in rural areas with reference to students' performance, is accepted.

One – way ANOVA analysis for the comparison of students' performance with respect teachers of Coeducational, Boys' Only and Girls' Only Schools revealed a statistically significant difference (F = 12.509, p<0.05) i.e. one – way, between – performance analysis of variance revealed a reliable effect of teachers of Coeducational, Boys' Only and Girls' Only Schools on students' performance (Table 16).

Table 16
One – way ANOVA table for Comparison of Students' Performance with respect to Teachers of Coeducational, Boys' Only and Girls' Only Schools

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	85.719	2	42.859	12.509	.000
Within Groups	1702.929	498	3.426		
Total	1788.648	499			

Mean scores of teachers from girls' only schools are more than the teachers of boys' only and co – educational schools. This suggested that teachers of girls' only schools are better than the teachers of boys' only and co – educational schools (Table 4.2.27 and Figure 4.2.24).

Table 17
Mean Scores of Students' Performance with respect to Teachers of Coeducational, Boys' Only and Girls' Only Schools

	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Boys only	5	6.5200	1.97164	.27883	2.00	10.00
Girls only	12	7.6750	1.42110	.12973	2.00	10.00
Co-education	33	6.7485	1.96638	.10825	2.00	10.00
Total	50	6.9480	1.89327	.08467	2.00	10.00

Thus the hypothesis H_{12}, i.e. there will be no significant difference among the students' performance with respect to teachers of coeducational school, boys' only and girls' only schools, is rejected.

Home Environment and Students' Performance in Mathematics

Stepwise regression analysis was performed to assess the impact of home environment on students' performance in mathematics. The initial model for the relationship between performance and home environment was as follows:

Performance = constant + b_1 Control + b_2 Protective + b_3 Punishing + b_4 Conformity + b_5 Social Inclusion + b_6 Rewarding + b_7 Deprivation of Privileges + b_8 Nurturance + b_9 Rejection + b_{10} Permissiveness

Table 18
Regression Analysis: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.648[a]	.419	.418	1.44411
2	.693[b]	.481	.479	1.36717
3	.718[c]	.515	.512	1.32253
4	.728[d]	.529	.526	1.30407

Stepwise regression suggested that out of 10 factors of home environment only four are main predictors of performance. These four factors are Control, Permissiveness, Punishing and Nurturance. R – square value is 0.529 which suggests that 52.9% variance in performance is accounted for the above mentioned four factors namely control, permissiveness, punishing and nurturance of home environment (Table 18). ANOVA table (Table 19) revealed that this dependence of performance on control, permissiveness, punishing and nurturance of home environment is significant as well ($F = 139.193$, $p<0.05$).

Table 19
ANOVA Summary Table

Model		Sum of Squares	df	Mean Square	F	Sig.
4	Regression	946.849	4	236.712	139.193	.000[d]
	Residual	841.799	495	1.701		
	Total	1788.648	499			

Using values of constant and regression coefficients from table 20, modified performance – home environment model is given by:

Performance = - 0.538 + 0.079 Control + 0.059 Permissiveness + 0.08 Punishment + 0.045 Nurturance

Table 20
Values of Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
4	(Constant)	-.538	.341		-1.578	.115
	Control	.079	.013	.288	6.137	.000
	Permissiveness	.059	.012	.198	5.108	.000
	Punishment	.080	.013	.254	6.181	.000
	Nurturance	.045	.011	.161	3.891	.000

Hence, in the light of above discussion, hypothesis H_{12} i.e there will be no significant impact of home-environment on students' performance in mathematics. is rejected.

Interactional Effect of Leadership Behaviour of the Principals, Teachers' Effectiveness and Home Environment on the Performance of Students in Mathematics

The last objective of the present study is to understand the effect of all three predictor variables taken together on the performance of students. To achieve this objective, results were analysed using multiple linear regression. Prior to forming a product term to represent interactions between leadership behaviour, teacher effectiveness and home environment, scores on three variables were centered by subtracting the sample means. The regression included teacher effectiveness, leadership behaviour, home environment, TE_LB, LB_HE, TE_HE and LB_TE_HE as predictor of students' performance in mathematics. The regression model for this objective would be

Performance = constant + b_1 LB_c + b_2 TE_c + b_3 HE_C + b_4 LB_TE_c + b_5 LB_HE_c + b_6 TE_HE_c + b_7 LB_TE_HE_c

Table 21
Regression Analysis – Model Summary for Explained Variance of Performance by Leadership Behaviour, Teacher Effectiveness and Home – environment

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
	.767[a]	.588	.582	1.22400	.588	100.269	7	492	.000

The overall regression is statistically significant with R = 0.767, R^2 = 0.588, adjusted R^2 = 0.582, F = 100.269, p<0.05 (Table 21).

Table 22
ANOVA Table for Relationship among Dependent and Independent Variables

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	1051.543	7	150.220	100.269	.000[a]
Residual	737.105	492	1.498		
Total	1788.648	499			

Findings of data analysis suggest that interaction between leadership behaviour and home environment is not significant, b_5 = 0.00006, p>0.05. Also the interaction between home environment and teacher effectiveness is not significant b_6 = 0.00008, p>0.05 (Table 23).

Interaction between leadership behaviour and teacher effectiveness is significant though regression coefficient is negligible. The interaction among three predictors of performance though is statistically significant, b_7 = - 0.000008, p<0.05. In other words, the slope to predict performance from leadership behaviour, teacher effectiveness and home environment becomes more negative (Table 23).

Home environment is statistically significant predictor of performance of students. Performance of student increases as psycho – social home environment of students is perceived to be good by students. Overall, there is a significant increase in performance of students with the increase in teacher effectiveness.

Table 23
Values of Constant and Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.110	.081		88.047	.000
	HE_c	.032	.002	.620	14.667	.000
	LB_c	.007	.005	.089	1.577	.115
	TE_c	.021	.004	.283	5.772	.000
	HE_LB_c	6.014E-5	.000	.024	.487	.626
	HE_TE_c	8.510E-5	.000	.040	.919	.358
	LB_TE_c	.000	.000	-.124	-3.270	.001
	LB_TE_HE_c	-8.140E-6	.000	-.092	-1.991	.047

Therefore, the hypothesis H_4 i.e. there will be no significant interactional effects of leadership behaviuor of principals, home environment and teacher effectiveness on students' performance in mathematics, is partially accepted.

Conclusion

The findings revealed clearly that the number of variables like home environment, teacher effectiveness and leadership behaviour are related to students' performance in mathematics. Home environment plays very important role on the performance of students. Teacher effectiveness is the secondary factor and leadership behaviour is the third factor on the performance of students in mathematics. Students who have psycho-social home environment like controlling, punishing, nurturance and permissiveness are better to perform well in studies. In ideal home environment, child receives encouragement for the desired performance, a keen interest in and love for child and opportunity to express freely. Students who live in a discipline atmosphere and take a mild punishment in their homes have a better performer in studies. The study indicates that if the child has an opportunity to express his/ her feelings freely to their parents is more effect on students' performance.

According to regression analysis, there is no effect of conformity, rejection and deprivation of privileges on the performance of the students in mathematics. In home environment wherein child is to perform as per parent's desires and expectations, or parents control children's behaviour by depriving them or their rights to seek love, respect and childcare from parents or child has no right to express herself/ himself and no right to become an autonomous individual, such home environment have no effect on students' performance.

Teacher effectiveness is the secondary factor which affects the student's performance in mathematics. Effective mathematics' teacher first judge natures of the students then apply different methods to solve all mathematical problems. Teachers of government schools have more impact on students' performance than the teachers of private schools. Government school teachers are well qualified and they are fully satisfied with their salaries and job security. They always help students to develop their skills and motivate them to fulfill their educational goals. Teachers of girls' schools are more effective. Girls are more sincere as compared to boys. They are more disciplined and listen to their teachers carefully. So girls schools teacher contribute a lot more effort to achieve their goals.

Leadership behaviour is the third important factor which affects the students' performance. As per the results of the study, female principals are more effective as compared to male principals.

It is primarily on account of multi-facet role played by a female in her life. She sometimes takes the role of students' mother for understanding and resolving their problems as a mother she is capable to solve the problems of her children tactfully. She inspires them and also scolds them for their mistakes. Government schools principals are more effective as compared to private schools. It was also observed that principals of girl's school are better than the principals of boy's only or co-educational schools on the performance of students in mathematics.

Educational Implications of the Study

The significance of any research work always relies on its implication in education for future. The present study deals with the factors which impact the students' performance in mathematics. This research clearly reveals that the home environment, teacher effectiveness and leadership behaviour are related to students' performance in mathematics. It was observed that home environment plays the utmost impact on students' performance, followed by teacher's effectiveness and leadership behaviour of the schools principals.

Suggestions

Suggestions for Principals

a. Principals should concern for performance of students and always motivate them to achieve their goals.
b. Principals should always be committed to their work.
c. Principals should try to build trust based relationship with their staff members.
d. Principals should always try to adopt time management and motivate others for the importance of time management.
e. Principals should identify the potentials of employees and give proper opportunities to employees.
f. Principals should always try to build confidence among staff members and students for overall development.
g. Principals should always listen to staff members' problems and try to resolve them
h. Principals should motivate employees to work with team spirit.
i. Principals should be good analyser so that they can manage conflicts tactfully.

Suggestions for Teachers

a. Teachers are the builder of the nation. They should use and apply appropriate teaching methods so that students should understand the problems and solve them easily.
b. Teachers should motivate students to achieve better results.

c. Teachers should guide and advise students at each and every step.

Suggestions for Parents

A child's first school is his family, his/ her parents from where he / she learn the first and the right lesson in life. Parents play a very vital role in bringing up their child.

a. Parents should provide sufficient facilities to their children to achieve higher education.
b. Parents should give an opportunity to their children to resolve all problems which they are facing.
c. Parents should have to be slightly strict about their children's study
d. Every child is unique, so parents should know behaviour of a child and give some extra care and affection to better understand the child.
e. Parents should impose some restrictions on children to discipline them.
f. Parents should provide an opportunity to child to express his views freely.

Limitations of the Study

a. The study was limited only to senior secondary school.
b. The academic Institutions of only NOIDA and Greater NOIDA were covered under the study.

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