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Influence of Socio-economic status of parents on perception of mathematics among the Upper primary students of Guwahati Metro

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Abstract: The term 'Socio-economic status' (SES) is used by social scientists and sociologists to describe the position of an individual in a hierarchical social structure. According to Chain (1944), socio-economic status includes both the social and economic status of an individual in the group. Several studies have confirmed that intelligence and socio-economic background are major contributors to mathematics achievement. The present study intends to investigate how parents' socio-economic status influences the perception of mathematics among the upper primary students. A descriptive survey design has been adopted for the study and the data are largely descriptive by nature. Questionnaires are used to collect the data from the students of 7^{th} and 8^{th} standards. These are administered on a sample of 780 students selected from 39 upper primary schools of Guwahati city. The internal reliability and validity were examined. The data collected are coded and submitted to a Statistical Package for Social Science (SPSS) analysis which indicates overall that students' perception of mathematics and the socio-economic status of their parents are significantly correlated. Different statistical tools were used to analyze and interpret of numerical data.

Keywords: Mathematical Performance, Perception of mathematics, Socio-economic status

Introduction

The term 'Socio-economic status' (SES) is used by social scientists and sociologists to describe the position of an individual in a hierarchical social structure. According to Chain (1944), socio-economic status includes both the social and economic status of an individual in the group. It is well known that children's educational outcomes vary sharply with their parents' socio-economic background. The environment at home influences a child's interest in school and also his/her aspirations for the future. Different learning environment is created by families of different socio-economic classes which affect the child's academic achievement (Foyle, Harvey, 1988) [1]. Socio-economic status can play both positive and negative role in the future life of a student. (Benbow and Stanley, (1980) [2].

Children from higher socio-economic status (SES) are not only brilliant but they also get better opportunities for intellectual, physical and emotional developments (Hiebert & Carpenter, 1992) [3]. Academic performance was influenced by socio-economic status (SES) of the children (Cavendish (1988). [4]. Parental occupation may influence student's performance in various ways. For example, sound income of the parents allows a child to get access to different learning opportunities and resources which can elevate his/her performance. Parental occupation may also influence how students perceive the value of mathematics learning, their belief about the usefulness of mathematics. Beaton (1996) also concluded from the results of TIMSS (Third International Mathematics and Science Study) that there is a strong positive relationship between students' achievement and parents' economic condition. Intellectual situation is dependent on socioeconomic status of the family (Gakhar, 1983) [5]. Academic performance was influenced by socio-economic status of the children (Cavendish, 1988) [4]. Beaton (1996) also concluded from the results of TIMSS (Third International Mathematics and Science Study) that there is a strong positive relationship between students' achievement and parents' economic condition. Parents' education can influence children's education through the transmission of parental beliefs and attitudes concerning the value and utility of education (Gakhar, 1983) [5].

A variety of factors such as parental education, occupation, income etc. might be included in the term SES. SES of a child is most commonly determined by combining parents' educational level, occupational status, and income level (Jeynes, 2002) [6]. Khan and Jemberu [7] studied the influence of socioeconomic status on educational and occupational, aspirations of high and low achieving adolescents. Wangoo and Khan (1991) observed a statistically significant relationship between academic achievement and socio-economic status while studying on the students of government and private schools of Srinagar (Jabbal, 1983) [8].Though the study of effects of socio-cultural factors on psychological characteristics of individuals has become the attention in the

contemporary psychological research, a few number of studies have been conducted so far in this area, that is perception of mathematics.

In order to study the children's interest in the subject like mathematics, it has become very much important to investigate their family background or in other words 'socio-economic status' of their family.

The influence of socio-economic status (SES) of parents on perception of mathematics among the students of Upper Primary schools has been investigated in the present study.

Objectives

- To study the 'socio-economic status' of the parents of the upper primary school students.
- To test the association between 'socio-economic status' of parents and 'perception' of mathematics among the students.
- To study the variation if any in the performance of students coming from various 'socio-economic background' and studying in different media of schools such as English, Assamese, Hindi and Bengali schools.

Hypotheses

Different null hypotheses which we assumed for our investigation are-

1. There is no significant association between 'socio-economic status' and 'mathematics perception' of students.
2. There is no significant difference between mean 'socio-economic status' scores of students from different media of schools.
3. There is no significant effect of 'socio-economic status' on 'mathematics perception' of students from different media of schools.

Samples

All the 200 upper primary schools of Guwahati city, irrespective of types of management (Government, Govt. provincialized and Private) and types of affiliation (SEBA, CBSE, CISCE and ISC), have been stratified in accordance with their medium of instruction such as English, Assamese, Bengali, Hindi, Bodo, Nepali and differently able. 20% of 85 English, 76 Assamese, 20 Bengali and 13 Hindi schools medium wise (except Bodo, Nepali and differently able) have been randomly selected as sample schools for intensive study. Lottery method of selective sample (20%) for each category has been followed. Total sample schools for detail investigation are 39. 10 students from each class VII and VIII (irrespective of sections, if any) 5 having good understanding of mathematics and 5 having less than averages understanding of mathematics identified by the mathematics teacher/s, of the classes, have been selected as sample students. At 90% confidence level with +_5% level of precision the estimated sample size was found to be 780. The sample sizes of 780 students from 39 schools are considered to be representative of student population of Guwahati.

Tools

Socio-Economic Status (SES) scale questionnaire:

The Socio-Economic Status (SES) scale questionnaire was used in order to assess socio-economic status of the parents of the sample students under the study. The questionnaire was developed on the basis of socio-economic status scale, updated version developed by B. Kuppuswamy. Kuppuswamy scale (Singh, Sharma and Nagesh) [10] is widely used to measure the socio-economic status of an individual in urban area. In order to account for devaluation of rupees, a modification on the item related to monthly income has been introduced. Due to the steady inflation and consequent fall in the value of the rupee, economic criteria in the scale lose their relevance over time. To modify the economic criteria, all India average Consumer Price Index for Industrial Workers (CPI-IW) for January,2017 was 274 (http:/labourbureau.nic.in/indexes.htm). The questionnaire focuses on three main variables which are the education and occupation of the head of a family and monthly income of the family. The modified family income for January 2017 was found in table 1. The modified questionnaire was then administered on the parents. The range of score point is from 3 to 29. Depending upon the score point obtained by the parents, the families were divided into five different socio-economic groups which are shown in the Table 2.

Table -1. Modified Family Income per Month (In INR)

Original (for the year 1976)	Score point	Modified (for the year 1998)	Modified (for the year 2007)	Modified (for the year 2017 Jan) (CPI-274)
≥2000	12	≥13408	≥19844	≥ 41430
1000-1999	10	6704-13407	9922-19843	20715-41429
750-999	6	5028-6703	7441-9921	15536-20714
500-749	4	3352-5027	4961-7440	10357-15535
300-499	3	2011-3351	2976-4960	6214-10356
101-299	2	677-2010	1002-2975	2092-6213
≤100	1	≤676	≤1001	≤2091

Table-2. Classification of Socioeconomic Status (SES)

SES class	Score points
Upper class (UC)	26-29
Upper Middle Class (UMC)	16-25
Lower Middle Class (LMC)	11-15
Upper Lower Class (ULC)	5-10
Lower Class (LC)	≤5

Reliability of SES questionnaire

The Cronbach Alpha was found to be 0.73 for the questionnaire that have been used for our study, which is greater than 0.70. The internal co-efficient Cronbach Alpha must be least 0.70 (Santos, 1999) [11] for an instruments to be used.

Validity of SES questionnaire

The reliability coefficient is 0.73. Hence, the index of reliability is 0.85. The present index of reliability implies that the test measures true ability of the subjects to the extent of 85%. That means the validity of the questionnaire is 0.85.

Table-3: Parents' Demographic Characteristics

SES Factor	**Category**	**Score point**	English		Assamese		Hindi		Bengali		All Schools	
			N	%	N	%	N	%	N	%	N	%
Father's education	Professional or Honours	**7**	-	-	-	-	-	-	-	-	-	-
	Graduate or Post Graduate	**6**	7	2.1	6	2.0	-	-	1	1.3	14	1.8
	Intermediate or Post High School Diploma	**5**	37	10.9	28	9.3	8	13.3	18	22.5	91	11.7
	High School Certificate	**4**	135	39.7	109	36.3	20	33.3	19	23.8	283	36.3
	Middle School Certificate	**3**	161	47.4	157	52.3	32	53.3	42	52.5	392	50.3
	Primary School Certificate	**2**	-	-	-	-	-	-	-	-	-	-
	Illiterate	**1**	-	-	-	-	-	-	-	-	-	-
Father's Occupation	Profession	**10**	334	98.2	297	99.9	56	93.3	78	97.5	765	98.1
	Semi-Profession	**6**	6	1.8	3	1.0	4	6.7	2	2.5	15	1.9

	Clerical, Shop owner, Farmer	**5**	-	-	-	-	-	-	-	-	-	-
	Skilled Worker	**4**	-	-	-	-	-	-	-	-	-	-
	Semi Skilled Worker	**3**	-	-	-	-	-	-	-	-	-	-
	Unskilled Worker	**2**	-	-	-	-	-	-	-	-	-	-
	Unemployed	**1**	-	-	-	-	-	-	-	-	-	-
Family income	>41430	**12**	-	-	-	-	-	-	-	-	-	-
	20715-41429	**10**	-	-	-	-	-	-	-	-	-	-
	15536-20714	**6**	3	0.9	-	-	1	1.7	-	-	4	0.5
	10357-15535	**4**	14	4.1	7	2.3	-	-	-	-	21	2.7
	6214-10356	**3**	70	20.6	69	23.0	19	31.7	13	16.3	171	21.9
	2092-6213	**2**	253	74.4	224	74.7	40	66.7	67	83.8	584	74.9
	≤2091	**1**	-	-	-	-	-	-	-	-	-	-

Analysis and Interpretation

In the Table 3 of distribution of students from English, Assamese, Hindi and Bengali it is revealed that 56.5 % students of English Medium and 16.7% students of Assamese medium are from upper class. There are no students in the upper class from Hindi and Bengali Medium under the study. From upper middle class there are 37.1% students from English medium, 38.3 % students are from Assamese medium, 16.7% of students are from Hindi Medium and 22.5% students are from Bengali Medium. In the lower middle class 6.5% students from English medium, 37.3 % students are from Assamese medium, 50.0% of students are from Hindi Medium and 77.5% students are from Bengali Medium. Similarly in upper lower class 7.7% are from Assamese medium and 33.3% are from Hindi Medium but no students from English and Bengali medium. There are no students in the Lower class from English, Assamese, Hindi and Bengali Medium under the study. The association between the students of various media of schools on SES was found to be significantly related (chi-square=246.104; df-8; sig. level 0.01).

Table-4: Sample Distribution on SES of Different Medium of Schools

SES	English		Assamese		Hindi		Bengali		Total		Chi-square
	N	%	N	%	N	%	N	%	N	%	
UC	192	56.5	50	16.7	-	-	-	-	242	31.0	246.104**
UMC	126	37.1	115	38.3	10	16.7	18	22.5	269	34.5	
LMC	22	6.5	112	37.3	30	50.0	62	77.5	226	29.0	
ULC	-	-	23	7.7	20	33.3	-	-	43	5.5	
LC	-	-	-	-	-	-	-	-	-	-	
Total	340	100	300	100	60	100	80	100	780	100	

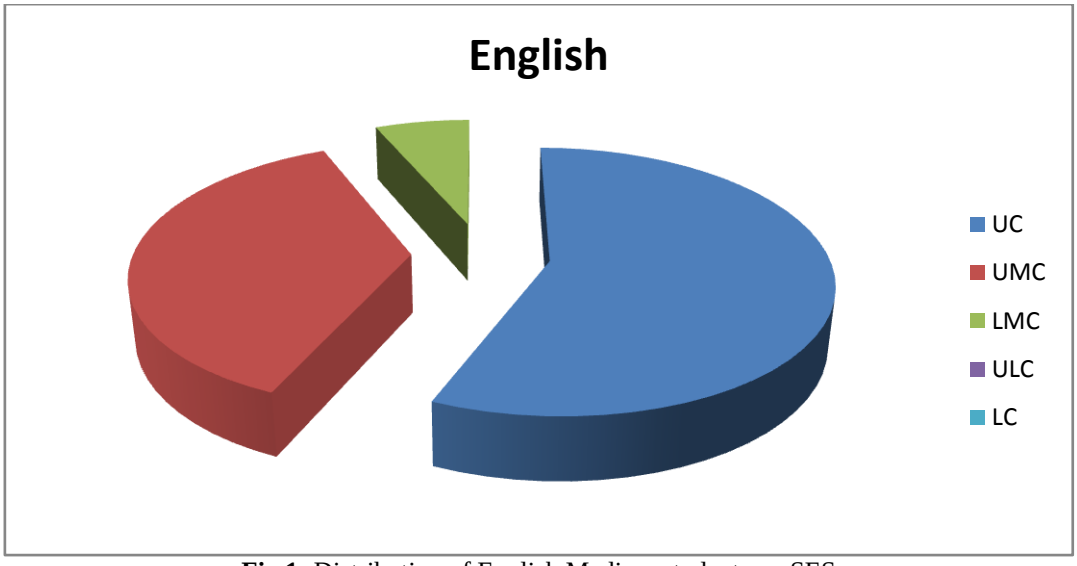

Fig 1: Distribution of English Medium students on SES

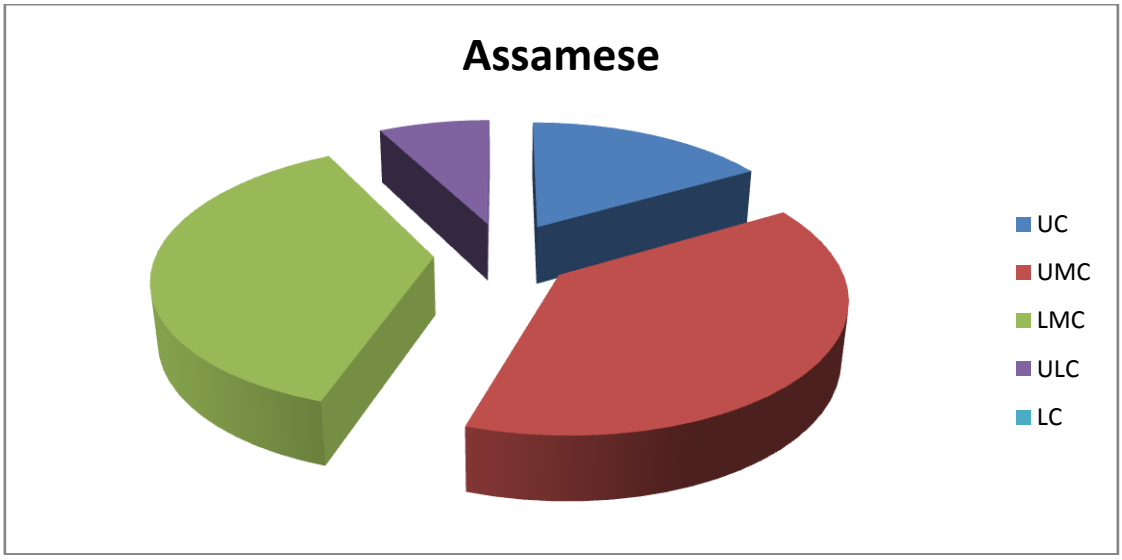

Fig 2: Distribution of Assamese Medium students on SES

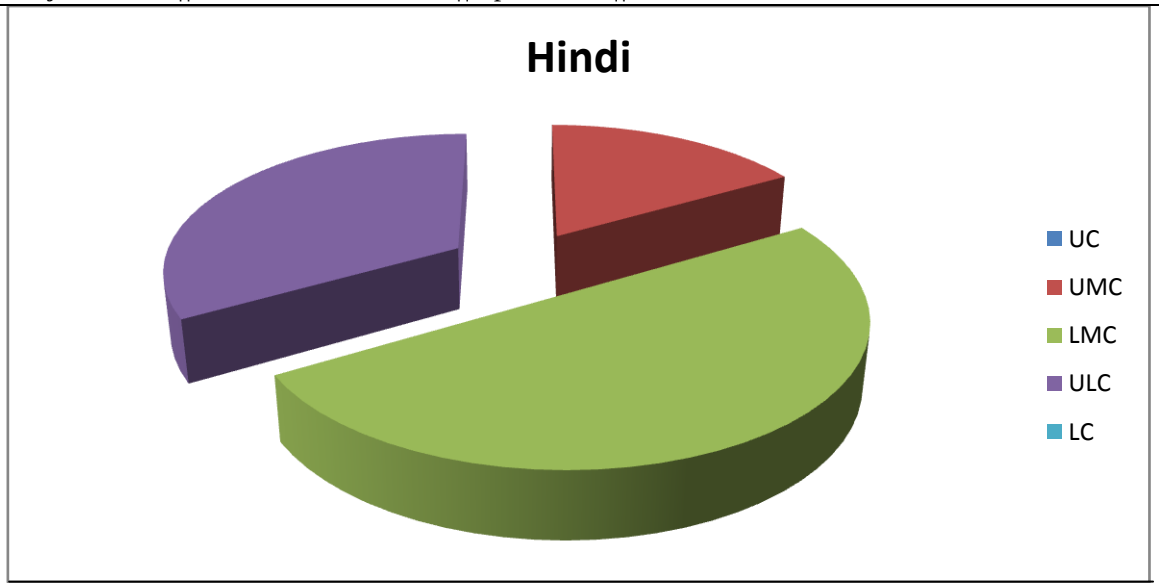

Fig 3: Distribution of Hindi Medium students on SES

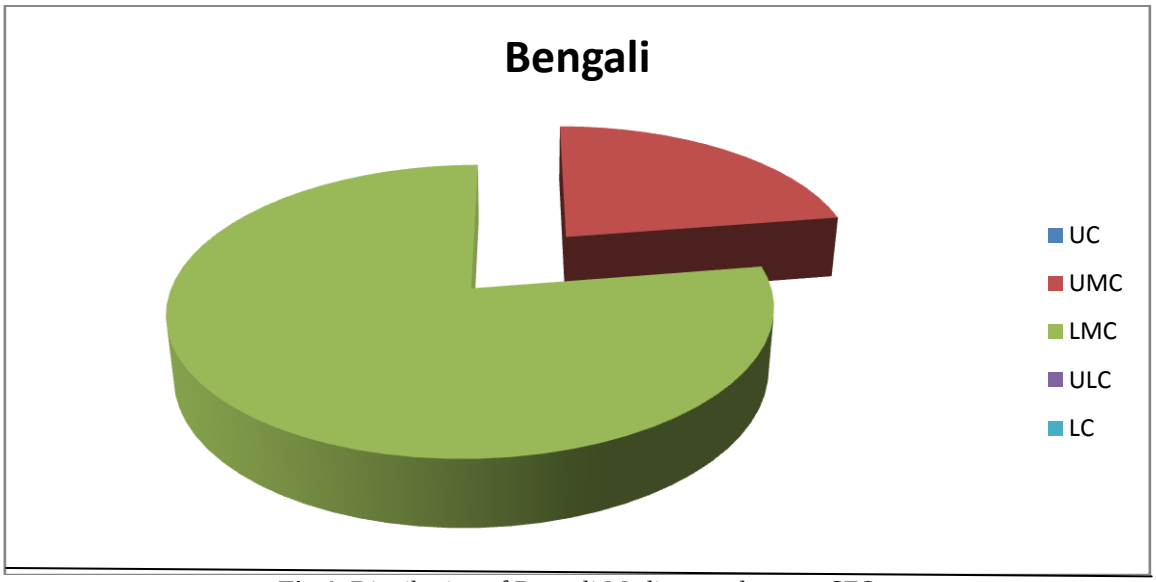

Fig 4: Distribution of Bengali Medium students on SES

ANOVA test is one of the tests which is run to examine if there is any difference between mean 'socio-economic status' scores of students from different media of schools. The Table-5 reveals the result of one way ANOVA analysis. This analysis was performed on SES of the students of different mediums of schools which are English, Assamese, Hindi and Bengali. The test is significant as found $p<0.001$. As a result there is evidence to reject the null hypothesis of no difference in means, i.e. the students from four different medium of schools like English, Assamese, Hindi and Bengali medium schools differ significantly on their SES.

Table-5: One Way Anova Types of Socio-Economic Status

	Squares	Df	Mean Square	F	Sig
Between Groups	5651.013	3	1883.671	54.360	0.000
Within Groups	26924.350	777	34.652		
Total	32575.362	780			

Table 6: Distribution of Students on SES with Performance Level in Mathematics

Class	Excellent		Very Good		Good		Satisfactory		Unsatisfactory		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
UC	60	24.8	45	18.6	111	45.9	15	6.2	11	4.5	242	31.0
UMC	75	27.9	51	19.0	118	43.9	21	7.8	4	1.5	269	34.5
LMC	19	8.4	42	18.6	106	46.9	37	16.4	22	9.7	226	29.0
ULC	2	4.7	5	11.6	19	44.2	10	23.3	7	16.3	43	5.5
LC	-	-	-	-	-	-	-	-	-	-	-	-
Total	156	20.0	143	18.3	354	45.4	83	10.6	44	5.6	780	100

Table 7: Classification on Performance Level

Levels of performance	Scores
Excellent	80—100
Very good	60—79
Good	40—59
Satisfactory	30—39
Unsatisfactory	Below 30

Table 8: Performance Level, Types of Socioeconomic Status, School Medium

School Medium	Performance level	Types of socio-economic status					Total
		UC	UMC	MC	LMC	LC	
English	Excellent	53	29	89	15	6	192
	Very good	42	25	54	3	2	126
	Good	2	1	8	5	6	22
	Satisfactory	0	0	0	0	0	0
	Unsatisfactory	0	0	0	0	0	0
	Total	97	55	151	23	14	340
Assamese	Excellent	7	16	22	0	5	50
	Very good	21	24	51	17	2	115
	Good	9	32	50	14	7	112
	Satisfactory	0	3	9	6	5	23
	Unsatisfactory	0	0	0	0	0	0
	Total	37	75	132	37	19	300
Hindi	Excellent	0	2	7	1	0	10
	Very good	4	5	13	5	3	30
	Good	2	2	10	4	2	20
	Satisfactory	0	0	0	0	0	0
	Unsatisfactory	0	0	0	0	0	0
	Total	6	9	30	10	5	60
Bengali	Excellent	0	0	0	0	0	0
	Very good	12	0	6	0	0	18
	Good	4	4	35	13	6	62
	Satisfactory	0	0	0	0	0	0
	Unsatisfactory	0	0	0	0	0	0
	Total	16	4	41	13	6	80

Table 9: Performance Level, Types of Socio-Economic Status, School Medium

School Medium	Performance level	Types of socio-economic status					Total
		UC	UMC	MC	LMC	LC	
All the schools	Excellent	60	45	111	15	11	242
	Very good	75	51	118	21	4	269
	Good	19	42	106	37	22	226
	Satisfactory	2	5	19	10	7	43
	Unsatisfactory	0	0	0	0	0	0
	Total	156	143	354	83	44	780

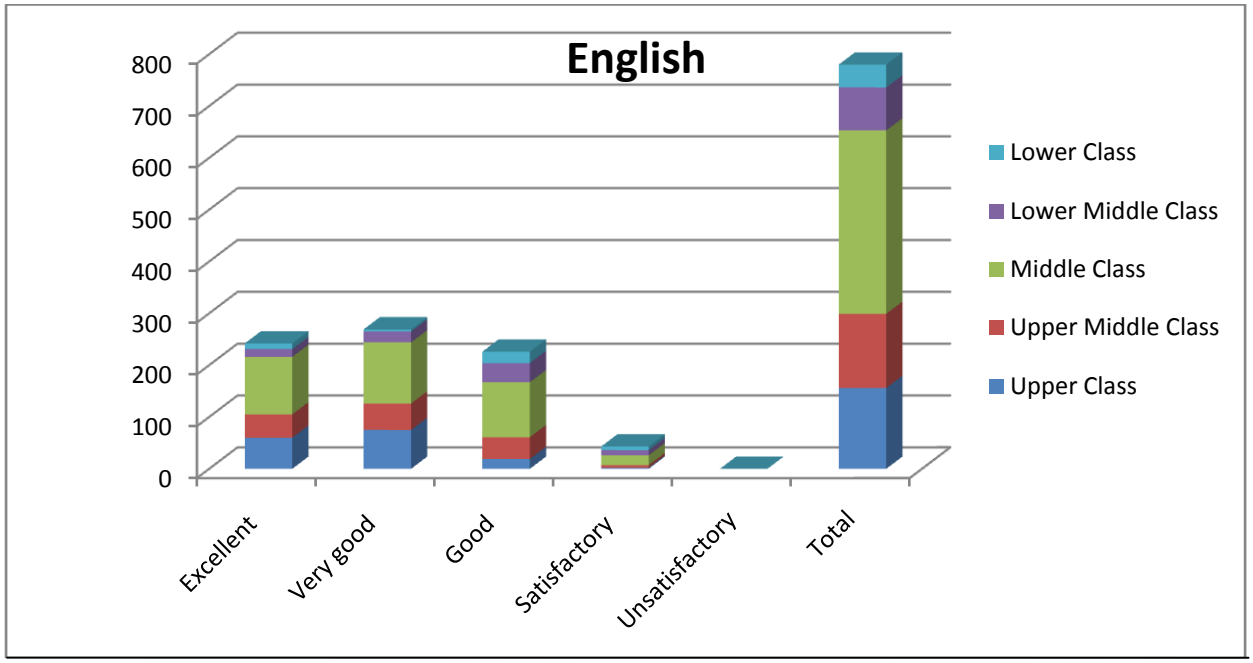

Fig 5: Performance level and SES of English

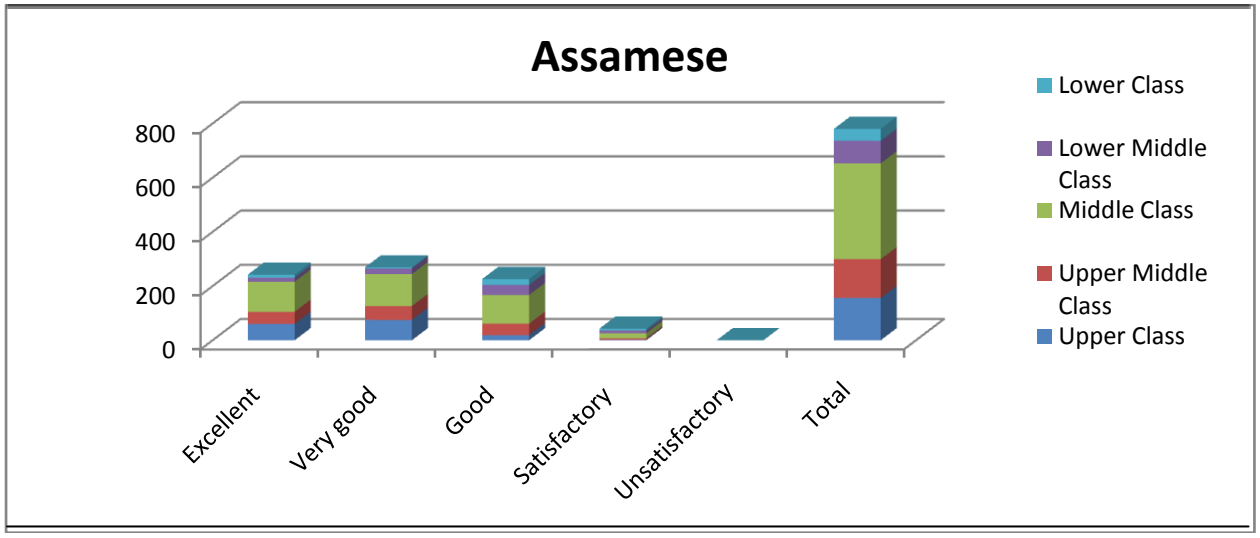

Fig 6: Performance level and SES of Assamese

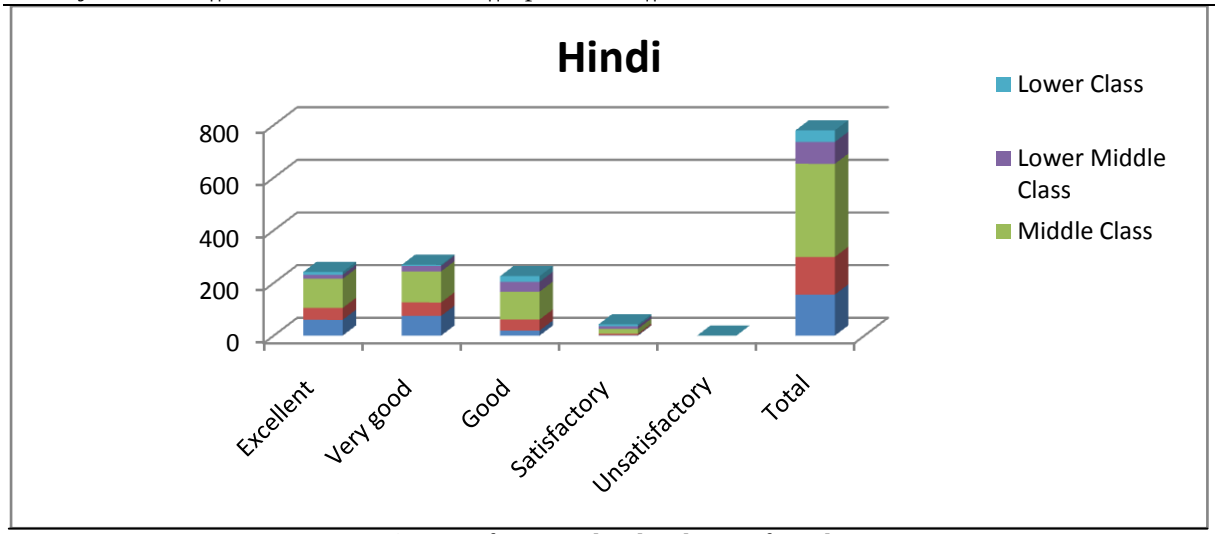

Fig 7: Performance level and SES of Hindi

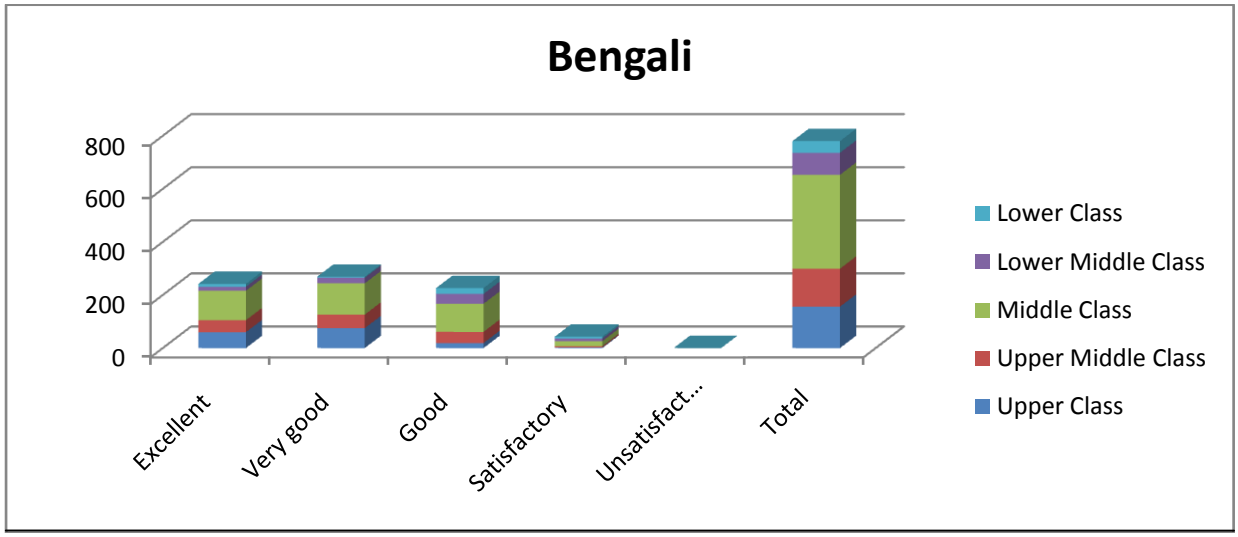

Fig 8: Performance level and SES of Bengali

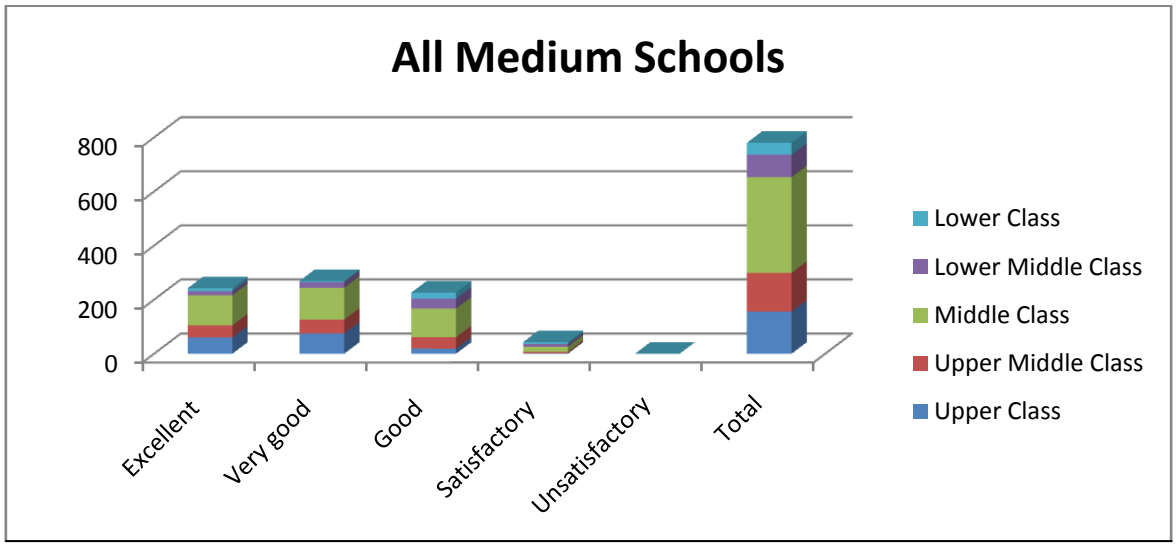

Fig 9: Performance level and SES of all schools

Table 10: Chi-Square Analysis

Medium of School	Chi-square value	Significance (2 sided)
English	50.808	0.000
Assamese	35.462	0.000
Hindi	4.356	0.842
Bengali	33.423	0.000
Over All	76.801	0.000

From the above outputs we can reveal that the chi-square statistic for the students of English medium was found 50.808 with *p*-value of 0.000 which is significant. So, there is no evidence to reject the null hypothesis that there is no association between SES and students performance in mathematics in this group. The chi-square statistic for the students of Assamese medium was found 35.462 with *p*-value of 0.000 which is significant revealing that there is no evidence to reject the null hypothesis that there is no association between SES and students performance in mathematics in this group. The chi-square statistic for the students of Hindi Medium was found 4.356 with *p*-value of 0.842 which is not significant. It reveals that there is no evidence to reject the null hypothesis that there is no association between SES and students performance in mathematics in this group. The chi-square statistic for the students of Bengali Medium was found 76.801 with *p*-value of 0.000 which is not significant. It reveals that there is no evidence to reject the null hypothesis that there is no association between SES and students performance in mathematics in this group.

But, overall the chi-square statistic is found to be 76.801 with a *p*-value of 0.000, which is significant. Therefore, there is evidence to reject the null hypothesis that there is no association between SES and students performance in mathematics in this group.

Table 11: Chi-Square Analysis

SES factors	Chi-square value	Significance (2 sided)
Father's Education	16.908	0.500
Father's Occupation	8.700	0.034
Income	16.491	0.490
Over all	76.801	0.000

Table 11 reveals that the socio economic status of the students' parents is positively correlated with the performance of the students in mathematics. In the components of SES like Fathers educational qualification, Fathers occupation and Monthly family income, the correlation was found to be positive with their children's performance in mathematics at 0.01level of significance.

Table 12: One Way Anova Students' Performance Levels in Mathematics

	Sum of squares	df	Mean square	F	Sig
Between Groups	5651.013	3	1883.671	54.360	0.000
Within Groups	26924.350	777	34.652		
Total	32575.362	780			

ANOVA was performed on the students' performance in mathematics from all the five classes of family where p-value was found to be significant **(**Table- XII). Therefore, there is evidence to reject the null hypothesis of no difference in means, i.e., the students from the various classes differ significantly on their performance in mathematics

Findings

1. The socio-economic status of the students of four different media of schools under the study is significantly different.
2. The socioeconomic status significantly affects students' performance in mathematics across the different medium of schools under the study.
3. There is a significant relationship between the components of socioeconomic status such as father's income, occupation, monthly family income and students' performance in mathematics.

Conclusions

The study intends to observe the effect of socio-economic status of parents on their children's performances in mathematics. The study attain at a conclusion in this respect that the socio-economic status of parents affects children's performances in mathematics. Observation of the components of socio-economic status of parents leads to state that the components such as father's education, occupation and monthly family income also affect independently children's performance in mathematics. So, the concerned policy maker's motive should be to try to put an emphasis for the uplift of the socio economic status of lower and lower middle classes so that the children are enriched in the subject. Parents also should be concerned for the all round improvement of their children.

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