



# Influence of Family and School Related Factors on Academic Performance of Students with Reference to Mathematics

Rajesh Kumar Thagurathi

<sup>1</sup>Associate Professor, School of Engineering, Pokhara University  
Corresponding Author Email Id: [rthagurathi@gmail.com](mailto:rthagurathi@gmail.com)

## To Cite this Article

Rajesh Kumar Thagurathi. Influence of Family and School Related Factors on Academic Performance of Students with Reference to Mathematics. International Journal for Modern Trends in Science and Technology 2022, 8, pp. 258-264. <https://doi.org/10.46501/IJMTST0802042>

## Article Info

Received: 18 January 2022; Accepted: 22 February 2022; Published: 25 February 2022

## ABSTRACT

*Education not only is the medium of being literate but also has been linked with its role in the development of human capital. Particularly, in a country like ours secondary education is observed as an important sector contributing to national and individual development which convinces by large to focus academic performance of the students as the fundamental part in educational development. This study thus aims to empirically examine the factors that affect mathematics performance of class 10 students studying in both community and institutional schools in Kaski district, Nepal. The family related factors include parental education, financial status and family size. Similarly, the school related factors include availability and usage of teaching learning resources in the school, type of school and location of school. The population of the study comprised students who have completed class 10 from schools in Kaski district. The study employs Multi-stage stratified random sampling to select sample 6 community and 6 institutional schools and a sample size of 448 respondents were used by the study using random sampling. A structured self-administered questionnaire of 5-point Likert scale has been used to collect data and the data collected has been analyzed using descriptive statistics, T-test, One-way ANOVA, correlation and multiple regression analysis. The study finds that there is disparity in mathematics performance. Students of community schools located in rural municipalities are found to have relatively weak performance in mathematics subject. Additionally, family related factors like parents' education, family income has been found to be important determinants of academic performance. However, school related factors like teaching learning facilities and teacher characteristics have been found not having significant effect in academic performance of mathematics.*

**KEYWORDS:** academic performance, school-based factors, mathematics performance.

## 1. INTRODUCTION

Education, in the global context, is considered as an element that stimulates socio-economic development of a nation that contributes in developing knowledge and skills required for producing human capital that can be better utilized for the development of national

economy. Education helps individuals to function well in their environment. Education plays a vital role in the development of human capital and is linked with an individual's opportunities for better living. Particularly, secondary education is considered as a fundamental base in many of the nation because of its contributory

role in imparting primary knowledge and skills to the thriving aspirants ready to contribute to the national development. Students are the most essential component of any educational institute and occupies a very important space in education and educational process. Their academic performance is a key feature in academic institution because it has been regarded as the major indicator of academic deliveries and progresses of such institutions. Academic performance which is normally measured by the examination results, is one of the major goals of school. Academic performance displays the knowledge attained or skills developed in the various disciplines of the school (Busari, 2000). In addition, academic performance is also regarded as an indicator of internal efficiency of physical and human resources and their performance, financial resources and academic performance, teacher motivation and has widely been accepted as an element of schools' promotion.

In this context, this study visualizes mathematics as a fundamental part of human thought and logic. Mathematics makes our life orderly and prevents chaos. Certain qualities that are nurtured by mathematics are power of reasoning, creativity, abstract or spatial thinking, critical thinking, problem-solving ability and even effective communication skills. Mathematics is assumed as a basis of all learning with other subjects deriving their concepts from it. Mathematics as a subject affects all aspects of human life at different levels. It provides the vital underpinning of the knowledge of economy. Although all careers require a foundation of mathematical knowledge, some are mathematics intensive. It is essential in the natural sciences, technology, engineering, business, finance, and ICT. It is also of growing importance in biology, medicine and many of the social sciences. Mathematics forms the basis of most scientific and industrial research and development. Many complex systems and structures in the modern world can only be understood using mathematics and much of the design and control of high-technology systems depends on mathematical inputs and outputs.

Mathematical competence of a student opens doors for pursuing technical education. A lack of mathematical competence keeps those doors closed. Despite knowing the importance of the subject, the achievement of the majority of the students in this

important subject over the years has not been encouraging at the SEE/SLC in Nepal. Mathema&Bist (2006) asserts that the average scores in Mathematics is lower than the average scores in other subjects, and lower than the overall average score in the SLC examinations of Nepal.

It has been the matter of discussion among academicians and policy makers regarding the factors affecting students' mathematics performance in school level. These factors could be inside or outside school and affect students' quality of academic achievement. Crosnoe et al (2004) mentioned that student factors, family factors, school factors and peer factors are the responsible for student's academic performance. The students' mathematics performance has to be improved by providing instruction based on individual student's needs and using a variety of methods to reach all learners. It is salient to explore the responsible factors which attract or distract the students towards mathematics. The study therefore considers student related factors as entry behavior, motivation level and attitude towards mathematics subject, the family related factors as parental education, financial status and family size and finally the school related factors as availability and usage of teaching learning resources in the school, type of school and location of school as major factors affecting academic performance and assumes them as major influencing factors in academic performance regarding their performance in mathematics and rationally aims to support policy makers, planners, academicians by helping them identifying the ways to upgrade the mathematics education of the country.

### **Objectives**

Student's performance in academics determines his/her capability to study particular area of study in upper level. For these reasons, the policy-makers, planners, educators, and the public as a whole look to the SEE results to make sense of how their children, schools, and the education system are doing. In alignment with this thought, this study attempts to examine the performance of class 10 students in Kaski district in mathematics delineating following objectives. The study thus specifically aims:

- to identify the impact of family related factors (parental education, financial status of family,

and family size) on mathematics performance of the students.

- to analyze the effect of school-based factors (availability and use of teaching-learning resources, school type, and teacher characteristics) on mathematics performance.

## 2. LITERATURE REVIEW

The review has been presented with the impression that academic performance is an indicator of internal efficiency of physical resources and academic performance. Facilities at all levels including equipment and human resources enhances the quality and relevance of imparted skills of learners thus provisions of adequate learning facilities at all levels promotes better academic performance (Lumuli, 2009). Learning involves interaction of students with the environment. Teaching and learning resources include classrooms, laboratories, libraries, playing fields, textbooks among others. Indeed physical resources go a long way in creating conducive environment that promote effective teaching and learning. It is with this in mind that school facilities are to some extent considered as yard sticks to be used to gauge the quality of secondary school education (RoK, 1995).

Mbugua et al (2012) have used the factors like student factors such as entry behavior, motivation and attitude; socio economic factors such as education of parents and their economic status; and school-based factor such as availability and usage of teaching/learning facilities, school type and teacher characteristics to influence the performance of a student in mathematics.

According to Farooq et al (2011) family characteristics like socio-economic status and parents' education have a significant effect on students' overall academic achievement as well as achievement in the subjects of mathematics. Student's gender strongly affects their academic performance, with girls performing better in the subjects of Mathematics, and English as well as cumulatively.

Learning involves interaction of students with the environment. Teaching and learning resources include classrooms, laboratories, libraries, playing fields, textbooks among others. Indeed physical resources go a long way in creating conducive environment that promote effective teaching and

learning. Juma (2011) links performance in examinations to state of teaching and learning resources in schools and summarizes that students from poor backgrounds perform poorly in the examinations because the poor reside in areas where schools are seriously underprivileged of basic physical facilities, and a sort of defiance gets inculcated in their early childhood that being in school is a waste of time may be because of the helplessness situations they confront.

This reflects that developments in schools and classroom meant that schools were dealing with more planned and sophisticated establishment of teaching learning environment in the school and such schools were meant to work exceedingly better in improving the academic performance of the students (Wilson, 2002). Whereas, Ali (2013) finds that the student's attitude is a major predictor of his/her performance specifically in subjects like mathematics. Moreover, the interactive teaching method is superior to the traditional approach, especially with respect to achieving higher order cognitive skills.

Enu et al (2015) revealed that teachers and students' self-motivation influence mathematics performance. Moreover, inadequate teaching and learning materials as well as lecturer method of instruction are some of the factors which affect students' performance.

Therefore, relying on the past extant literatures this study assumes academic performance as and education production function pertaining to various factors of input such as parental education, financial status, family size and other school-related factors like pupil-teacher ratio, instructional materials, physical facilities that affect the quality of education. Large pool of past studies studied about the inconsistencies in school facilities and academic performance considering policy planning as major element whereas this study attempts to visualize academic performance being influenced by family and school based factors and hence follows the following conceptual framework.

**Conceptual Framework:**

## 3. METHODOLOGY

The population for this study is the schools in Kaski district which are teaching the students of class 10.

Multi-Stage Stratified Random Sampling technique has been adopted for this study purpose. The schools have been divided in to two categories: institutional schools and community schools. Further, these schools have been divided into two categories in terms of location wise: urban (within metropolitan city) and rural (within rural municipality). Sample students have been selected randomly using the attendance-sheet of the concerned school employing systemic random sampling method.

The data have been collected using structured questionnaire comprising 5-point Likert scales items to assess family based factors and student related factors and data were collected through self-administered structured questionnaire. Internal consistency of the scales were checked using Cronbach's Alpha.

Descriptive measures like mean, percentage, and standard deviation have been used to explore the descriptive information. Frequency and Percentage were used to interpret the profile of the respondents too. Independent sample t-test, ANOVA, Pearson's correlation coefficient, multiple regression has been used as inferential statistical tools.

#### 4. MAJOR FINDINGS

Employing the conceptual framework as stated above, the study discloses and discuss following major finding and discussions as its key research output.

##### Profile of Students

There were altogether 448 respondents (students) out of which 223 students from Government/Community Schools whereas 225 students from Institutional/Private Schools.

**Table 1: Frequency and Percentage Distribution of the Students in terms of School Type**

Levels	Counts	% of Total
Government/Community School Students	223	49.8 %
Institutional/Private School Students	225	50.2 %

##### Parents' Educational Attainment

The following table shows that the father of the majority of respondents studied class 10 or below whereas the father of the only 10.9% of respondents have achieved master level education or higher. The following table shows that the mother of the majority of

respondents studied class 10 or below whereas the mother of the only 4.9% of respondents have achieved master level education or higher.

**Table 2: Frequency and Percentage Distribution of the Parent's Educational Attainment**

Levels	Father's Educational Attainment		Mother's Educational Attainment	
	Counts	% of Total	Counts	% of Total
Class 10 or below	251	56.0	290	64.7
Plus-Two Level	88	19.6	91	20.3
Bachelors Level	60	13.4	45	10.0
Masters Level or Above	49	10.9	22	4.9

In a traditional Nepali family, the father is considered the head and the provider of the family while the mother takes responsibility of the domestic needs and in-charge of the emotional growth and values formation of the children. They both perform different tasks and being remarked separately by the children. Children see their mothers soft and calm, while they regard their fathers as strong and the most eminent figure in the family.

##### Students' Performance in Mathematics according to the Father's Academic Attainment

The following table reveals that the higher the academic attainments of the father better the performance in mathematics of children.

**Table 3: Performance of the Students in terms of Father's Education**

Students' Performance in Mathematics	Father's Education				Total
	Class 10 or below	Class 12	Bachel or Level	Maste rs or above	
Obtained less than 60 marks	52.2%	35.6%	16.9%	12.8%	40.0%
Obtained 61 to 70 marks	23.3%	24.1%	15.3%	17.0%	21.7%
Obtained 71 to 80 marks	11.6%	19.5%	20.3%	10.6%	14.2%
Obtained 81 to 90 marks	7.2%	8.0%	15.3%	14.9%	9.5%

Obtained more than 90 marks	5.6%	12.6%	32.2%	44.7%	14.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

### Students' Performance in Mathematics as per the Mother's Academic Attainment

The following table reveals that the higher the academic attainments of mother better the performance in mathematics of children.

**Table 4: Performance of the Students in terms of Mother's Education**

Students' Performance in Mathematics	Mother's Education				Total
	Class 10 or below	Class 12	Bachelor Level	Masters or above	
Obtained less than 60 marks	47.9%	28.1%	22.7%	13.6%	39.7%
Obtained 61 to 70 marks	21.5%	24.7%	18.2%	18.2%	21.7%
Obtained 71 to 80 marks	14.6%	16.9%	9.1%	9.1%	14.2%
Obtained 81 to 90 marks	8.7%	9.0%	13.6%	13.6%	9.5%
Obtained more than 90 marks	7.3%	21.3%	36.4%	45.5%	14.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

### Students' Performance in Mathematics according to the Monthly Family Income

The following table reveals that the higher the monthly income of the family better the performance in mathematics of children.

**Table 6: Correlation Matrix**

	MPSAT	SHM	SCM	VMS	CMTC	TLF
MPSAT	—					
SHM	0.421 ***	—				
SCM	0.295 ***	0.469 ***	—			
VMS	0.247 ***	0.455 ***	0.272 ***	—		
CMTC	0.186 ***	0.298 ***	0.195 ***	0.196 ***	—	
TLF	0.175 ***	0.190 ***	0.224 ***	0.150 **	0.407 ***	—

The result reveals that all the variables have positive and significant correlation with performance satisfaction in mathematics subject. 'Study habits in mathematics' is found to have the largest

**Table 5: Performance of the Students in terms of Monthly Family Income**

Students' Performance in Mathematics	Monthly Family Income				Total
	less than Rs.25,000	Rs.25,000 - Rs.49,999	Rs.50,000 - Rs.99,999	Rs.1,00,000 or more	
Obtained less than 60 marks	58.8%	34.5%	32.1%	23.1%	40.0%
Obtained 61 to 70 marks	21.3%	23.9%	17.9%	25.0%	21.7%
Obtained 71 to 80 marks	10.3%	17.6%	14.3%	15.4%	14.3%
Obtained 81 to 90 marks	5.1%	9.2%	14.3%	11.5%	9.5%
Obtained more than 90 marks	4.4%	14.8%	21.4%	25.0%	14.5%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

### Correlation Analysis

It can be seen from the following table that all variables: Study Habits in Mathematics (SHM), Self-confidence in Mathematics (SCM), Current Math Teacher's Characteristics (CMTC), Teaching and Learning Facilities (TLF), and Value of Mathematics Subject (VMS) are positively correlated with Mathematics Performance of Students (MPSAT).

correlation followed by self confidence in mathematics. The lowest correlation has been found for the variable teaching learning facilities. Moreover, the results depict that student related factors have higher correlation

while school related factors have relatively lower correlation with mathematics performance satisfaction.

### 5. MULTIPLE REGRESSION ANALYSIS

It was assumed that the Mathematics Performance of Students (MPSAT) depends upon the variables: Study Habits in Mathematics (SHM), Self-confidence in Mathematics (SCM), Current Math Teacher’s Characteristics (CMTC), Teaching and Learning Facilities (TLF), and Value of Mathematics Subject (VMS). The output of the multiple regression model reveals overall or joint significance of the model as the F-statistics has been found to be significant in one percent level of significance.

**Table 7: Regression Model Fit Measures**

Model	R	R <sup>2</sup>	Overall Model Test			
			F	df1	df2	P
1	0.449	0.202	22.2	5	438	<.001

The value of R-squared reveals that around 20 percent of the variation in the dependent variable mathematics performance is explained by the independent variables in the model. The remaining variation is explained by factors not included in the multiple regression model. The following table presents the beta coefficients, standard errors, t-statistics associated with each beta coefficients and the p-values.

**Table 8: Regression Model Coefficients-MPSAT**

Predictor	Estimate	SE	t	P	Stand. Estimate
Intercept	0.4087	0.3299	1.239	0.216	
SHM	0.4279***	0.0704	6.079	0.001	0.3217
SCM	0.1874**	0.0831	2.256	0.025	0.1099
CMTC	0.0377	0.0520	0.724	0.469	0.0347
TLF	0.0726	0.0457	1.591	0.112	0.0749
VMS	0.0720	0.0585	1.230	0.219	0.0589

Note: \*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < .001$

The results of the study reveal that students performance in mathematics subject is effected the most by their study habits followed by self-confidence in perceiving that they can do well in the subject. An important finding is that the variables affecting mathematics performance are student related factors. In contrast, school related factors are found not having significant effect in the mathematics performance of the students. This result corroborates with the results of the correlation analysis.

### 6. CONCLUSIONS

The results of the study reveal that the mathematics performance of class 10 students in Kaski district is not satisfactory, especially in community schools. The study finds that there is disparity in mathematics performance across community and institutional schools. Students of community schools located in rural municipalities are found to have relatively weak performance in mathematics subject. It can be concluded that the schools having well developed physical resources which are resourcefully abundant in arranging school based facilities were found to be having better performance. In contrast to it, the academic performance of the students were found being negatively impacted in schools where comfortable environment wasn’t facilitated for study to the students.

In conclusion, learning aids which supports schools in their teaching and parental factors that influences the mental and physical well-being of the students are integrative elements that influences the academic performance and teaching-learning environment in the schools may it be in any subject or discipline. Additionally, performance in mathematics is found to be influenced by parental income and education. Therefore, considerations of parental income and education while planning educational deliverables are also important factors that affect not only mathematics performance but almost it could be same across all the subjects. It is found that although the students value mathematics subject and perceive math teacher favorably, their confidence in mathematics subject is low. Student related factors like study habits and self-confidence has been found to be important determinants of performance in mathematics subject. However, school related factors like teaching learning

facilities and teacher characteristics have been found not to effect mathematics performance.

### **Suggestions for Future Researchers**

Since this study only focuses on the family related factor and the school related factors further researchers can incorporate some household or home related factors and analyze the extent of relationships with academic performance. Besides, the study is only limited to mathematics and is confined to a single district, which can be further extended by future researchers by including more geographic locations and disciplines in order to broaden the study spectrum.

### **Conflict of interest statement**

Authors declare that they do not have any conflict of interest.

### **REFERENCES**

- [1] Ali, HO, 2013, 'Factors Affecting Students' Academic Performance in Mathematical Sciences Department in Tertiary Institutions in Nigeria' US-China Education Review A, vol. 3, no. 12, pp. 905-913.
- [2] Crosnoe, R., Johnson, M.K., & Elder, G.H. (2004). School size and the interpersonal side of Education: An examination of race/ethnicity and organization context. *Social Science Quality*, 85(5),pp.1259-1274.
- [3] Enu, J., Agyman, O.K., &Nkum, D. (2015). Factors Influencing Students' Mathematics Performance in Some Selected Colleges of Education in Ghana. *International Journal of Education Learning and Development*, 3(3). pp.68-74.
- [4] Farooq, M.S., Chaudhary, A.H., Shafiq, M., Berhanu, G. (2011). Factors Affecting Students' Quality of Academic Performance: A Case of Secondary School Level. *Journal of Quality and Technology Management*, 7(2), pp.01-14.
- [5] Juma, F. (2011). The Relationship Between mode of Teacher Motivation and students Academic performance in Public Secondary Schools in Bungoma North District. Unpublished M.Ed. Project Report, Moi University, Kenya
- [6] Mathema, K. B. &Bist, M. B. (2006). Study on Student Performance in SLC.
- [7] Lumuli, N. C. (2009). An investigation into Internal Efficiency measures in Promotion of Access and completion Rates in Public Secondary Schools in Bungoma South District. Unpublished M. Ed Thesis, University of Nairobi.
- [8] Mbugua, Z.K., Kibet, K., Muthaa, G.M., &Nkonke, G.R. (2012). Factors Contributing to Students' Poor Performance in Mathematics at Kenya Certificate of Secondary Education in Kenya: A Case of Baringo County, Kenya. *American International Journal of Contemporary Research*,2(6), pp. 87-91.
- [9] Hijazi, S. T. & Naqvi S.M.M. (2006) Factors Affecting Students' Performance: A Case of Private Colleges. *Bangladesh e-Journal of Sociology*. 3(1)