The influence of socio-economic status on mathematics performance in secondary schools: The case of Ubungo and Temeke, Dar es Salaam, Tanzania

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Recommended Reference: Katabwa, J. N. (2025). The influence of socio-economic status on mathematics performance in secondary schools: The case of Ubungo and Temeke, Dar es Salaam, Tanzania. *African Quarterly Social Science Review, 2*(4), 617–628. https://doi.org/10.51867/AQSSR.2.4.57

ABSTRACT

Despite numerous efforts to improve mathematics performance, results have continued to decline. Little has been done to examine the influence of socio-economic factors on mathematics performance, highlighting the need for this study to fill the knowledge gap. This study employed a quantitative research approach under a cross-sectional survey design. The study was guided by Bronfenbrenner's Ecological Systems Theory, which posited the unique interrelationship between home, school, and community environments and students' learning outcomes. The theory suits the study as it develops the framework for understanding disparities in mathematics achievement among students from various socio-economic backgrounds. Through random sampling technique, a semi-structured questionnaire was used to collect data from a sample of 360 students considered as 10% of the whole Form Four student population from 12 public secondary schools with poor national examination results from 2018 to 2023 in the Ubungo and Temeke districts, Dar es Salaam region, Tanzania. Additionally, 60 teachers from the same schools were sampled and interviewed to obtain a thematic qualitative analysis of the study. Quantitative data were analyzed using multiple linear regression models using SPSS packages. The findings showed a statistically significant relationship at the 5% level between students' performance and key SES variables, including family income, parents' education level, and parental influence on students' educational matters. Higher parental income, involvement, and positive influence were linked to better student performance in basic mathematics, while lower SES factors were associated with poorer outcomes. The study concluded that SES factors, especially parental income, education level, and occupation, play a critical role in students' success in mathematics education. The findings recommended that secondary schools could establish a Parents-Teachers' Association (PTA) to strengthen collaboration between the school and community to improve learning quality and better academic results. The government and other stakeholders should allocate funds to build hostels and dormitories around day schools and support children from low-income families.

Keywords: Education, Mathematics Performance, Socio-Economic, Secondary School

I. INTRODUCTION

Education is a key driver of the social and economic development of any Nation in the world. The bright future of any country depends upon the educational system that builds morality and behaviors of its citizens, which in depth requires attractive investment in education on a global scale (Ali & Jameel, 2016). Mathematics, as a core subject in any education system, is defined as a science of computations and reasoning or the study of numbers, quantities, and shapes (Mbarute & Ntivuguruzwa, 2022). On the other hand, Katabwa and Kalemile, (2025) defines Mathematics as a branch of knowledge that seeks to improve human perception and environment by using clear, logical, precise, and exact thinking processes. It plays a critical role in enhancing analytical and problem-solving skills, which promote any national prosperity in providing tools for understanding science, technology, engineering, and economics (Mapaire, 2016). Mathematics equips students with uniquely powerful ways to describe, analyze, and also to change the world (Shahanga & Kasambala, 2024). According to Kitta (2004), Mathematics is a language that helps us to describe ideas and relationships drawn from our environments. Ali and Jameel, (2016) claimed that it is a common belief of educationists that no one can make progress in any field without having the basic knowledge of mathematics. In spite of its massive importance and contributions in education, Mathematics is seen as the most difficult subject in the world (Percy et al., 2023), and Tanzania is not exceptional. Most of the students find it difficult to pass and discontinue it at graduate levels, and one of the most common reasons behind this discontinuity and failures in mathematics directly shifts the attention of educators towards a poor mathematical background at the secondary level (Azigwe et al., 2016).

Mathematics Performance can be defined as a measure of students' ability to use mathematics to solve real-world problems (Wu, 2025). According to Mrigo and Rogers (2021), Students' performance in any subject, including Mathematics, at all levels of education is measured through tests and examinations. In Tanzania, Mathematics performance at secondary levels is overall measured by the National Examinations Council of Tanzania (NECTA)

through assessments and examinations (Mazana et al., 2020). Observing factors behind failures in mathematics in global cases, Theron (2025) identified a huge failure in South African mathematics education between 2015 and 2024. He stipulated the root causes, such as insufficiently trained teachers, inadequate facilities, and a shortage of resources. However, these factors contrast with higher-performing countries like China, Singapore, and Korea. Mbarute and Ntivuguruzwa, (2022) concluded that Students' failure in upper secondary education is greater than in ordinary secondary schools in Rwanda. They identified poor enrolment of students in higher colleges in Rwanda in areas of natural and applied sciences due to low performance in mathematics in upper secondary schools. In Uganda, there has been a decline in academic performance in the mathematics subject over others in ordinary secondary schools for many years (Percy et al., 2023). Furthermore, Nduku and Philomena, (2016) revealed the prolonged poor performance in Mathematics for both primary and secondary schools in Kenya.

Tanzania, likewise, has revealed a huge failure in the mathematics subject to students, particularly in ordinary or junior secondary school level for over fifteen years up to now (Salyungu, 2015; Mazana et al., 2020; Kissima et al., 2024; Shahanga & Kasambala, 2024). For instance, Mazana et al. (2020), who assessed students' performance in mathematics in Tanzania, highlighted the trends of poor performance in mathematics from 2008 to 2016 in the ordinary level secondary school students, and the failure percentage rates ranged from 75.7% to 87.9%. These studies have explored different significant factors contributing to poor performance in mathematics, among them are Socio-economic factors (Mrigo & Rogers, 2021). Socio-Economic Status (SES) is the term used to describe the position of an individual or group in a hierarchical social structure or class, which includes both the social and economic factors (Gunendra & Sujan, 2017; Byiringiro & Hesbon, 2025). It is often measured by a combination of education, income, and occupation of an individual or group. Low socio-economic status and its correlates, such as low education, poverty, and poor health, ultimately affect the society as a whole (Wang et al. 2014). In other words, the Socio-Economic Status (SES) of a family has been defined as the position of a family in the social class. This could be determined by parents' educational level, occupation, and income. Nyambi, (2019) included family size and style of life as factors that determine socio-economic status in a family, whereas those factors, to a larger extent, influence children's school academic achievement in general.

Further studies were prompted to identify other contributing factors behind students' poor performance in mathematics at all levels of education in Tanzania. Many emphasize that high failure rates have been attributed to many factors, including the absence of competent teachers, inadequate teaching or learning resources such as books and other leaning tools (James & Julius 2019; Shahanga & Kasambala, 2024; Emmanuel & Heri, 2025). However, few of them have considered the impacts of Socio-economic factors. In China and other developed countries, there is an increasing number of empirical studies in education and psychology that suggest that SES plays a key role in students 'academic development and mathematics achievement in particular (Wang et al., 2014; Genadek & Hill, 2017; Hernandez, 2014; Guendra & Sujan, 2017). According to Wang et al. (2014), the influence of SES on students' achievement in mathematics was found at different school levels, with more evidence being found in primary, middle, and secondary schools. Some of the factors discussed in their study were indiscipline (both educators and learners); promotion policies, drug, alcohol abuse, and pregnancy in female learners.

Ovansa, (2017) on the effect of socio-economic status on the academic performance of senior pubic secondary schools in Nigeria indicated that socio-economic status, including parents' academic background, parents' occupation, and family income, influences student academic performance. Based on their findings, including parents with high socio-economic status recommended to assist schools in the area of educational development and the government should introduce scholarship schemes to assist basic and social amenities to less privileged students in all public schools. Soharwardi et al. (2020) argued that the socio-economic status of the parents plays a significant role in determining the academic performance of their offspring. However, parents from the low socio-economic status groups may be powerless to meet the expenses of resources such as books, computers, or tutors to produce this helpful literacy environment. Additionally, Mauka (2015), in the study of parents' involvement in the achievements of students in schools, addressed some factors in the social context that contribute to the poor performance of their students. The study considered factors such as a low level of education among the majority of the parents, low income of the family, and poor communication between parents and teachers. The study by Nduku and Philomena, (2016) added that the major reason for disparities in mathematics performance over the years in Kenyan schools is due to a lack of parental involvement in students' educational matters.

Different initiatives were put in place by the Tanzanian government to address these issues in order to raise students' performance in mathematics and other science subjects. The government has been employing science and mathematics teachers in at least every financial year to curb the shortage of mathematics teachers in public schools. Priorities on loans to students from sciences and mathematics courses in higher learning institutions in order to emphasize students to take serious on mathematics seriously while they are in secondary levels have been much considered. Several projects have been initiated to enhance teachers' pedagogical content knowledge and teaching approaches. Education Reform Compact (ERC) with eight development partners and a transformative Program for Results of Big Results Now in Education (BRNEd) was among the developed projects. These were expected to fast-

track the improvement in the quality of basic education service delivery, which in turn brings tangible improvement in learning outcomes of students for better performance in Mathematics and other science subjects. Moreover, education stakeholders, including the Tanzania Institute of Education (TIE), the Mathematics Association of Tanzania (MAT), public and private universities, have been organizing teachers' support programs, enhancing teachers' capacity in teaching and learning competencies of mathematics education.

Despite these initiatives taken to curb the situation, there is still little improvement in Mathematics performance for all levels of education in Tanzania. Unlike previous studies, which often applied generalized SES measures to examine general academic achievements of students, few studies have been done to examine the influence of Socio-economic factors on students' performance in mathematics for Dar es Salaam secondary schools and Tanzania in general. However, no specific study has conducted a quantitative analysis of the influence of Socio-Economic status on basic mathematics performance for secondary schools in Dar es Salaam. Therefore, the current study necessitates the need to conduct a statistical analysis addressing how parents' Socio-Economic Status (SES) can affect their students' mathematics performance at the ordinary secondary school level. SES factors such as Parental influences, parental education levels, and parents' income will be quantitatively and qualitatively analyzed. A Multiple regression model that describes the relationship between Socio-Economic Status (SES) and students' performance in basic mathematics at ordinary schools in Dar es Salaam, in the case of Ubungo and Temeke Municipals, will be developed. The results will be significant to educational policy makers, educational administrators, and non-governmental organizations (NGO's) on how to handle the Socio-Economic Status (SES) of families to improve the students' performance in mathematics for their entire future success.

1.2 Research Objective

To assess the influence of socio-economic status on students' mathematics performance in secondary schools

II. LITERATURE REVIEW

2.1 Theoretical Review

2.2.1 Bronfenbrenner's Ecological Systems Theory (1979)

This study was guided by the Ecological Systems Theory developed by Bronfenbrenner in 1979. Broadening the scope beyond individual interactions, ecological systems theory examines the environmental contexts in which learning process occurs. This theory posits that learning is influenced by direct classroom interactions as well as larger systems, such as family, school, and community environments at large. It provides a framework for understanding disparities in mathematics achievement among students from diverse socio-economic backgrounds. Students from low-income families often face challenges such as limited access to educational resources and under-resourced schools, which collectively hamper their academic progress. Conversely, students from strong economic backgrounds benefit from a synergy of enriched home environments and strong classroom support. The supportive empirical studies demonstrate the critical role of these broader systems. For instance, Lesh and English (2005) found that mathematical understanding and problem-solving abilities are deeply rooted in interactions within family and community support networks. Moreover, Ovansa (2017) emphasized the importance of socio-economic resources in shaping students' mathematical development. Their findings suggested that improving mathematics outcomes requires addressing systemic inequalities and fostering stronger partnerships between schools, families, and communities. Interestingly, Azigwe et al. (2016) urged that the Socio-Economic Status (SES) of families is an important determinant of child learning outcomes. They further cemented that children born into poor families face an educational disadvantage both before they enter school and throughout their education, such that SES to a large extent determines educational outcomes, which in turn determine the SES of the next generation. Applying Bronfenbrenner's Ecological Systems Theory helps to observe how interaction of these contextual variations across home, school, and community levels influence students' academic outcomes. This theoretical lens therefore supports the study's objective of understanding the multidimensional relationship between socio-economic status and mathematics performance among secondary school students in Dar es Salaam.

2.2 Empirical Review

2.2.1 Parental Influences on Mathematics Performance.

Parents' influence on the educational success of their children in mathematics performance is associated with some key factors, such as parents' attitudes towards the mathematics subject, parents' working hours, and parental involvement in children's educational progress. Many findings have highlighted the impacts of parental-child education interactions and the related achievement in mathematics. For instance, Mohr-Schroeder et al. (2017) investigated both the influence of parents and their students' attitudes towards mathematics performance. Their study was statistically significantly positively correlated between the parents' and students' attitudes toward mathematics success. The study

by Mbarute and Ntivuguruzwa, (2022) underlines the critical role that school environments play in influencing students' performance in Mathematics. They found that inadequate learning resources, low parental encouragement, and the long distances students must travel to school have significant negative impacts on academic success. However, many parents have less influence on helping their children with mathematics because they are not confident in their own mathematical abilities (Wachira, 2016). Erika Patall, an Associate professor of educational psychology, writes: When it comes to helping students with homework, education and psychology research suggests that it all depends on how parents become involved. Sometimes when kids struggle with homework, parents have an instinct to take control by using commands, incentives, threats, surveillance, or just doing the work themselves, and these tactics may work in the short term, but they won't benefit kids in the long run. Also, Genadek and Hill (2017) on parents 'working time impact on their children's performance in academics, revealed that some parents' jobs lead them to fail to have enough time to spend with their children in guiding them to educational-related matters. Also, the lack of parental involvement in education matters has been a key reason behind the massive failure of Mathematics in Kenyan Schools (Nduku & Philomena, 2016)

2.2.2 Parents' Education Level and Students' Mathematics Performance

The educational level of parents has an influence on the value placed on education, which in turn has an influence on the educational practices at home (Azigwe et al. 2016). Educated parents tend to transmit to their children the academic culture they had acquired at school, which can positively impact on child's learning and performance. Yara (2010) reported that better-educated parents are able to raise their children to have healthy self-perceptions about their academic abilities and engagement in intellectual activities. Therefore, such parents also generally have children with fewer behavioral problems that can hinder their learning experiences. Wang et al. (2014) revealed that Chinese students' SES has a significant influence on their mathematics achievements and several important constituents of SES, such as mothers' educational level, fathers' occupation, and family income. Nduku and Philomena, (2016) found that parental education and socioeconomic status have an impact on pupil achievement; pupils whose parents were both college-educated tended to achieve at the highest levels in their academics. Hence, the parental education seems to be a significant factor in fostering the mathematics performance of their children.

2.2.3 Parental Income on Students' Mathematics Performance

Parental income in most cases is determined by the major economic activity of a parent or his/her occupation. Several findings have identified a significant positive relationship between good parental income welfare and educational achievements, including mathematics success. Smith, (2006) found that children from low-income families, with less involved parents, often experience lower academic benefits than children coming from higher-income families. According to Mauka (2015), parents with low incomes are unable to provide sufficient home needs and school requirements for their children. Low income in the family also forced some students to take part in the income generation activities to support the families; thus, reducing their time for learning. Abety and Ndamsa, (2025) revealed in the studies across different African countries that children from families with educated parents generally perform better in school, including in key subjects such as mathematics and science. It was concluded that parental income significantly influenced students' academic success, with wealthier families better positioned to afford private schooling, remedial classes, and educational technologies. Therefore, assessing how parents' educational level influences their children's mathematics performance at the secondary level seems to be a very interesting study. Most of the reviewed literature of SES impacts on students' academic performance were done in social context and in qualitative nature of the research. However, few of them have examined the impacts of SES factors on Mathematics performance in which no one have considered public schools in Dar es Salaam region whose results have been worse in the recent years. This has emerged as huge research gap to fill for betterment of education and development in Tanzania and beyond.

III. METHODOLOGY

3.1 Study Area

This study was conducted in Ubungo and Temeke municipalities in Dar-es-Salaam Region in Tanzania. These Municipalities are among the 5 administrative districts in the Dar-es-Salaam region. Ubungo district is bordered to the North by Kinondoni district, to the East and the South by Ilala district, and to the West by Kisarawe and Kibaha districts from the Coast region. While Temeke district is bordered to the North by Ilala district, to the East by the Indian Ocean and Kigamboni district, to the South by Mkuranga district, and to the West by Kisarawe district, both from the Coast region. Ubungo and Temeke have been experiencing a huge failure percentage rates in mathematics compared to other districts regional-wise and beyond over the past five years (2018-2023) based on NECTA Form four examination results, which raised the interest to conduct the current study.

3.2 Research design

This study employed a quantitative research approach under a cross-sectional survey design. The design was considered because it enabled the researcher to collect data at a single point in time from a relatively large sample, allowing for statistical analysis of the relationship between students' socio-economic status (SES) and their performance in basic mathematics. This approach is appropriate for identifying patterns and relationships among variables across different schools and socio-economic contexts within a limited time frame (Creswell, 2012).

3.3 Target Population

The target population comprised form four students and their teachers from 12 secondary schools within Ubungo and Temeke districts in Dar es Salaam, Tanzania. Ubungo district has 36 public secondary schools while Temeke comprises a total 26 public secondary schools. Those two districts were purposively selected due to their diverse socio-economic characteristics and poor academic performance in form four examination results within the years 2018-2023 compared to other districts in the region.

3.4 Sample Size

A total of 420 respondents participated in the study. This sample was determined as 10% of the whole targeted population from both districts as proposed in Creswell's (2012) guidelines for survey research, which emphasize representativeness and feasibility. The sample included 360 form four students and 60 teachers drawn from 12 secondary schools (six schools from each district) whereas each school, 30 students and five teachers were selected using simple random sampling, representing both genders and different socio-economic backgrounds.

3.5 Data Collection Instruments

Data were collected using semi-structured questionnaires for students and structured interview guides for teachers. The student questionnaire focused on assessing the influence of indicators of socio-economic status including parental education, occupation, and income to students' mathematics performance records. Teacher interviews were used to obtain insights into how socio-economic factors influence student engagement and achievement in mathematics. All instruments were pre-tested to ensure validity and reliability before the main data collection exercise. Data were analyzed using both descriptive statistics and multiple linear regression model for combined and individual influence of different SES indicators.

3.6 Model Formulation

The Multiple linear regression model is used to establish the relationship between students' performance in basic mathematics (Y) as the dependent variable and SES indicators as the independent variables, which include Parental income, Education level, and Parental influences in the student's education. However, Parental income at the family level is divided into three sub-variables, which were high-income family (X_1), Middle-income family (X_2), and Low-income family (X_3). Parent's level of education was also subdivided into three sub-variables namely; Father's educational level (X_4), Mother's educational level (X_5) and Highly educated parents (X_6) and finally, Parent's influences on students' education matters is divided into six sub-variables; Father's influence (X_7), Mother's influence (X_8), Parents in the formal employment (X_9), Parents' working hours (X_{10}), Parents in informal employment (X_{11}) and Parental involvement in education (X_{12}). This study assumes that the variables are linearly related in the equation of this form: -

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_{12} X_{12} \quad (3.1)$$

Where:

X_k's are explanatory variables of Y and $\beta_k{}'s$ There are multiple regression coefficients.

These coefficients represent the effect of a change in each of the explanatory variables on the students' performance(Y). The method of least squares was used to estimate the regression coefficients of the model. Suppose that $n > k$ observations are available and let X_{ij}Denote the i^{th} observation on the level of the variable X_j The observations are$(X_{i1}, \ldots, X_{ik}, Y_i)$ for $i = 1, \ldots, n$ and $n > k$ Where n represents the number of observations and k Represents the number of predictor variables, which is 12 in the current study.

The normal equations associated with the regression matrix can be written in matrix notation as;

$$\mathbf{X}^T \mathbf{X} \hat{\boldsymbol{\beta}} = \mathbf{X}^T \mathbf{Y} \quad (3.2)$$

On the assumptions that the inverse matrix exists, the equations have a unique solution, which is the vector of ordinary least squares estimates. Finally, using Calculus rules for matrices, it can be derived that the ordinary least squares estimate of the β coefficients are calculated using the matrix formula:

$$\hat{\beta} = \left(\mathrm{X}^T \mathrm{X}\right)^{-1} \mathrm{X}^T Y \quad (3.3)$$

Where represents the transpose of X , and represents the inverse matrix.

IV. FINDINGS & DISCUSSION

4.1 Performance in Basic Mathematics

Students' performance in basic mathematics was assessed to form four groups based on their Form Two national examination results for the year 2023. The data were collected through a questionnaire administered to the students and teachers from 12 public secondary schools; the students responded that over 66% of them scored below credit (Grade C). To assess the level of performance, the respective students were asked to state their results in basic mathematics according to NECTA's grade from A' 81-100% (Excellent), B'65 - 74% (Very Good), C'45 - 64% (Good), D's 30-44% (Fair) and F' below 30% (Failed). Data were finally summarized and presented in Table 1.

Table 1

Students' Performance in Form Two Basic Mathematics

SN	Grade	Frequency	Percent
1	A	16	4.4
2	B	58	16.1
3	C	48	13.3
4	D	95	26.4
5	F	143	39.7
	Total	**360**	**100.0**

4.1.1 Parents' Education Level

The results revealed that the majority of the parents had an almost secondary education level, where mothers were 82.5% and fathers were 86.6%. Due to parents' ignorance, they do not know the importance of education to their children and to society; therefore, they do not respond by providing educational support to their children, otherwise they discourage it and encourage dropout **(Table 2).**

Table 2

Parents' Education Level

SN		Fathers' Education		Mothers' Education	
	Level	**Frequency**	**Percent**	**Frequency**	**Percent**
1	Non-formal	93	25.8	79	21.9
2	Primary level	132	36.7	145	40.3
3	Secondary level	88	24.4	73	20.3
4	College/ University	47	13.1	63	17.5
	Total	**360**	**100.0**	**360**	**100.0**

4.1.2 Parents' Occupation

The study interviewed students about the major economic activities performed by their parents, and it was found that 56.3% fathers were peasants, no formal employment, and street vendors, while 66.9% mothers were peasants, no formal employment, and food vendors (Table 3).

Table 3

Parents' Occupation

SN		Fathers' Occupation		Mothers' Occupation	
	Status	**Frequency**	**Percent**	**Frequency**	**Percent**
1	Peasants	75	20.8	58	16.1
2	Street vender	37	10.2	59	16.4
3	No formal employment	91	25.3	124	34.4
4	Employed	150	41.7	118	32.8
5	Major business owner	7	2.0	1	.3
	Total	**360**	**100**	**360**	**100**

4.1.3 Model Analysis

The model equation was analyzed to investigate the goodness of fit of the model to the data. Measures of goodness of fit to be discussed are the coefficient of determination and the adjusted coefficient of determination. $\bar{R}^2$. The coefficient of determination is a key output of regression analysis. It is defined as the proportion of the variance in

the response variable that is predictable from explanatory variables. It provides some information about the goodness of fit of a model, implying that it is a measure of how well the regression line approximates the real data points. The extreme values of the coefficient of determination are zero; it indicates that the model explains none of the variability of the response data around its mean, and one, when the residual variance is zero, which indicates that the model explains all the variability of the response data around its mean, implying that the fit is perfect. This implies that, $0 \le R^2 \le 1$. The small R^2 implies that the disturbance variance $\left(\sigma^2\right)$ is large relative to the variance of y, which means that β_j is not estimated with precision. The equation is adjusted to obtain $\bar{R}^2$ value to account for both sample size and number of explanatory variables. $\bar{R}^2$ can help guard against over-fitting (including explanatory variables that are not really useful) and penalizes the analysts for adding terms to the model.

The coefficient of determination R^2 is computed as $R^2 = \left(1 - \frac{SSE}{SST}\right)$

Where:

SSE is the magnitude of the unexplained variation with $\left(n-k-1\right)$ degrees of freedom, and SST is the total variation with $\left(n-1\right)$ degrees of freedom, where n is the number of observations and k is the number of explanatory variables, using these definitions the equation becomes,

$$R^2 = 1 - \frac{\sum\left(Y_i - \hat{Y}\right)^2}{\sum\left(Y_i - \bar{Y}\right)^2} \qquad (4.1)$$

Where Y represent students' performance, $\hat{Y}$ represents the predicted students' performance and $\bar{Y}$ represents the mean students' performance.

Thus $\bar{R}^2 = 1 - \frac{\left(n-1\right)}{\left(n-k-1\right)}\left(1-R^2\right)$ (4.2)

Standard Error S_e, is the estimate of the common standard deviation, σ which measures the dispersion of the errors around the mean.

$$S_e = \sqrt{\frac{\sum\left(Y_i - \hat{Y}_i\right)^2}{n-k-1}}$$

4.1.4 Model Summary

The model summary presented in Table 4 shows that the regression model explains a substantial portion of the variance in students' mathematics performance. The corrected values indicate that the model has an R Square of 0.791, meaning that approximately 79.1% of the variability in mathematics performance is explained by the predictor variables included in the model. The Adjusted R Square of 0.622 confirms that, even after adjusting for the number of predictors, the model still accounts for 62.2% of the variation. This supports the reliability and strength of the model in explaining students' performance outcomes. The ANOVA table was generated to find out if there is any significant relationship between performance as the dependent variable and family income, parents' level of education, and parents' social influences as independent variables. Analysis of the findings depends on whether there is any significant relationship between student performance and family income, parents' level of education, as well as parents' influence on the educational success of a student (Table 4).

H_0: There is no significant relationship between student performance, parental income, and parents' level of education, as well as parents' influence.

H_1: There is a significant relationship between student performance, family income, and parents' level of education, as well as parents' influence.

Table 4

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.789	.791	.622	1.121

4.1.5 Analysis of Variance (ANOVA)

Analysis of variance results indicated that the p-value < 0.05, hence the null hypothesis is rejected at 5% level and thus we assert that there is a significant relationship between student performances and parents' income, parents' level of education, as well as parents' influences (Table 5).

Table 5
ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	93.594	12	7.799	6.209	.000
	Residual	435.862	347	1.256		
	Total	529.456	359			

Variable: Mean grade in Form Two Exams

4.2 Multiple Regression Results

4.2.1 Effects of Individual Variables in the Model

The regression coefficients table was generated to determine the regression coefficients, the most important predictor, as well as to identify if there is any significant relationship between the independent variables and the dependent variable. Beta coefficients for standardized regression coefficients were analyzed to measure the impact of each explanatory variable on the response variable.

The regression results obtained depicted the Following Model:

$Y = 3.452 + 0.100X_1 - 0.035\ X_2 - 0.038\ X_3 – 0.150\ X_4 – 0.012\ X_5 – 0.030\ X_6 – 0.273\ X_7 – 0.041\ X_8 – 0.063\ X_9 + 0.063\ X_{10} – 0.081\ X_{11} + 0.090X_{12}$

Results indicate a positive correlation and influence of high family income on students' performance in basic mathematics (β= 0.1 and p-value = 0.038). This implies that the higher the income, the higher the performance. On the other hand, middle- and low-income families show inverse relationships and non-significance with p-values of 0.422 and 0.514, respectively.

Conversely, the negative correlation between the two in both cases with ((β= -0.150 and p-value = 0.026) for father's educational level and (β= -0.012 and p-value = 0.042) for mother's level of education level respectively, was observed. This means that as the educational level of the parents becomes higher, there are more chances for the student to perform poorly compared to students whose parents have a low level of formal education. The p-values also suggest that the variables are statistically significant.

Furthermore, in the case of parent involvement in students' education matters, results showed a positive correlation between the variables with (β= 0.090 and p-value = 0.015). This means that the performance of students whose parents are more involved in their children's educational and academic progress at school is higher than that of students whose parents are not much involved in their children's educational and academic progress at school. In addition to that, the analysis shows that the variable is also statistically significant. Other indicator(s) such as the influence of parent employment nature to the student's performance were also tested. The results showed a negative correlation for parents in formal employment with (β= -0.063 and p-value = 0.148) and a positive correlation for those in informal employment with (β= 0.081 and p-value = 0.074). Based on these results, it is revealed that, better performance for students whose parents are in informal employment and poor performance for students whose parents are in formal employment. Interestingly, working hours for parents is significant with p-value 0.010 and shows a positive correlation with students' performance, as all presented in (Table 6).

Table 6
Regression Coefficients Results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.452	.506		6.817	.000
	X_1	.100	.048	.112	2.079	.038
	X_2	-.035	.054	-.033	-.653	.514
	X_3	-.038	.048	-.043	-.805	.422
	X_4	-.150	.084	-.108	-1.780	.026
	X_5	-.012	.086	-.008	-.135	.042
	X_6	-.030	.045	-.036	-.661	.509
	X_7	-.273	.066	-.266	-4.150	.000
	X_8	-.041	.073	-.036	-.567	.571
	X_9	-.063	.043	-.076	-1.451	.148
	X_{10}	.063	.050	.064	1.256	.010
	X_{11}	.081	.045	.091	1.789	.074
	X_{12}	.090	.066	.069	1.360	.015

Dependent Variable**:** Mean grade in Form Two

4.3 Discussion

4.3.1 Student Performance in Mathematics versus Parental Income

The study found that most of the parents/guardians are very poor based on the nature of their jobs/occupations (Table 3). The respondents from poor families signified that the majority of their parents with informal occupations were mostly unable to provide enough support for their children, unlike parents with formal occupations. This was literally supported by (Azigwe et al., 2016; Mbarute & Ntivuguruzwa, 2022) that most of the parents with low income gain cannot afford to provide enough support to their children's education needs, such as to provide education expenses and other school contributions. The regression results in (Table 6) shown that high family income (X_1) was statistically significant at 0.05 level implying that students from those families are likely to perform better in academics compared to those from mid-and low-income families (X_2 & X_3). In the same vein, Ovansa (2017), Abety and Ndamsa, (2025); Gunendra and Sujan, (2017); Ali &Jameel, (2016), and Emanuel & Heri, (2025) hold the same results. One of the key respondents from Ubungo district replied that

> "*Most students whose parents have no specific jobs or are low-income oriented families do not have money for transport fare and food, therefore they have to walk for a long distance to school with hunger even during their final examinations"*.

Moreover, academic master in one of the schools in Ubungo replied

> *"Due to poverty in many families, some students would support themselves for their educational expenses and needs; as such, these students do not attend school daily to get time to engage in economic activities to get money for their family and school needs"*.

This situation increased truancy among students, with the consequence of poor academic performance. Similarly, (Byiringiro & Hesbon 2025; Mohr-Schroeder et al., 2017) findings align with these results.

4.3.2 Mathematics Performance and Parent's Education Level

The study revealed that most parents in both districts had low educational attainment, with the majority completing only primary school or below (Table 2). Initial assumptions of the study revealed that low parental education has been associated with poor academic outcomes, as indicated by several studies (Khan et al., 2015; Azigwe et al., 2016; Byiringiro & Hesbon, 2025). However, the regression results in Table 6 showed an unexpected pattern: father's education (X_4) and mother's education (X_5) both displayed negative coefficients (β= –0.150 and β= –0.012 respectively). This proposes that higher parental education, within this sample, was associated with slightly lower student performance in mathematics. Although these coefficients were not statistically significant at the 0.05 level, their direction conflicts with established literature as well as earlier interpretations in the paper. Furthermore, parents with advanced education variable X_6 was not statistically significant at 0.05 level representing the similar results. To interpret this contradiction, it is important to consider contextual social and cultural dynamics. Qualitative insights revealed that even parents with relatively higher education were often unable to provide effective academic support. Some were employed in demanding jobs, leaving little time to supervise or motivate their children. One of the key informants in Temeke district supported this saying,

> *"Most of the students attending the school nowadays do not understand their future education career, hence lacking the desire to study harder in their classes due to a lack of education motivators from their families*".

Other parents are not competent in mathematics, limiting their ability to assist students with schoolwork. As such, formal education does not automatically translate into active academic involvement. Additionally, some parents both educated and non-educated view educational expenses and hostel payments as unnecessary. Others hold restrictive gender norms, believing that educating girls is a wastage of time and resources. These observations align with findings from Mrigo and Rogers (2021), Hernandez (2014), and Emmanuel and Heri (2025), which emphasize that parental engagement, expectations, and cultural beliefs have stronger effects on student performance than education level alone. Thus, the negative coefficients observed may not indicate a real inverse relationship between parental education and student performance, but rather reflect the complex socio-economic context of the study area, though further research with larger samples is recommended to examine the persistence of this trend.

4.3.3 Students' Performance versus Parent Influences on Educational Progress

The study also observed that parental influences on the educational progress of their children have a huge impact on students' academic performance. For instance, regression results shown that parental involvement in students' education matters (X_{12}), parent's working hours (X_{10}) and father's influences (X_7) in (Table 6) were statistically significant at 0.05 significance level. This gives the support that general parental attitudes and influences towards student academic success, involvements and time they spend at work could have significant impact on their children academic performance at school. It was also documented in (Yara, 2010; Genadek & Hill, 2017) that parental involvement in students' education matters, parental attitude towards student academic success including mathematics,

and hours they spend with their children on education issues can boost their performance at school. However, both variables (X_9 & X_{11}) parents working in informal and formal sectors were not statistically significant but most parents from both districts were employed in the informal sector (Table 3). These obviously spent more hours in their major economic activities due to the nature of their jobs to limit time spending with their children at home. One of the key respondents in Temeke schools replied that

> *"Because of lack of time and awareness most of parents do not even appear in the general school meetings organized by school board which aims on developing strategies to boost academic performance of their children*".

This reduced the good interactions between parents, teachers and children leading to the drawback of their academic progress. Similar observations were explored in (Rasheed et al., 2019; Nduku & Philomena, 2016; Mauka, 2015). Other social needs like lack of conducive home environments, negative parental altitudes on female children as stated in (Smith, 2006; Wang et al., 2014; Abety & Ndamsa, 2025) were observed to hamper the performance of most of students from both districts.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

Based on the findings of this study, it is concluded that there is a significant relationship between students' performance in mathematics and Social Economic Status (SES) factors, i.e. parental income, parents' level of education, and parents' influence at 5% level of significance. The finding indicated that parents' economic stability seems to be the most influential factor of students' performance in basic mathematics, followed by parents' education level and involvements. In addition, most students reported that their parents do not cooperate with teachers as they do not visit schools to make follow-up on the academic progress and other education matters of their children, which leads to poor performance.

5.2 Recommendations

The study recommends that secondary schools should introduce the parents-teachers' cooperation (Parents-Teachers Association, PTA) as most public primary schools do. This will initiate full collaborations of teachers and parents on identifying and solving different socio-economic challenges facing students while at school or at home in order to improve mathematics performance and general academic achievements. In addition, Local Government Authorities (LGAs), the owners of most of the public schools, should use part of their own domestic revenues to build school hostels to accommodate students. Parents and guardians must be required to contribute other requirements of their students at school**.** Lastly, Education stakeholders and other financial institutions should initiate funds for sponsoring students from the poorest families who performed better in mathematics at the primary level. This will motivate students from poor families and peer groups to take serious consideration of mathematics performance from primary levels.

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