© IJARW | ISSN (O) - 2582-1008
November 2026 | Vol. 8 Issue. 5
www.ijarw.com

THE EFFECT OF SOCIOECONOMIC STATUS ON STUDENTS' ACADEMIC PERFORMANCE IN MATHEMATICS

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ABSTRACT

Socioeconomic status (SES) remains a critical determinant of educational outcomes in secondary mathematics education. This empirical statistical study investigates the direct effect of socioeconomic status on the academic performance in Mathematics among Grade 8 learners (Section Galaxy, N = 30) at Malabog National High School, Paquibato District, Davao City. Employing a quantitative descriptive-correlational and comparative research design, participants were categorized into three distinct SES groups based on monthly family income: Low (<= Php 5,000; n = 10), Average (Php 6,000–10,000; n = 10), and High (>= Php 11,000; n = 10). Academic performance was measured using official quarterly grades in Mathematics 8. Descriptive statistics revealed mean performance scores of 79.00 (SD = 2.45) for Low SES, 84.00 (SD = 3.65) for Average SES, and 91.00 (SD = 3.65) for High SES learners. Pearson product-moment correlation analysis demonstrated a strong, statistically significant positive relationship between socioeconomic status and mathematics academic achievement (r = .828, p < .001). Furthermore, One-Way Analysis of Variance (ANOVA) established highly significant differences in mathematics performance across the three SES categories, F(2, 27) = 29.966, p < .001, eta^2 = .690. Post-hoc Tukey HSD multiple comparisons confirmed significant pairwise performance gaps between Low and Average SES (mean diff = -5.00, p = .008), Low and High SES (mean diff = -12.00, p < .001), and Average and High SES (mean diff = -7.00, p < .001). The study concludes that household financial standing exerts a profound influence on mathematical mastery, underscoring the urgent necessity for targeted remedial instruction, equity-based resource allocation, and DepEd contextualized learning support for economically disadvantaged high school learners.

Keyword: Socioeconomic Status, Academic Performance, Mathematics 8, Pearson Correlation, One-Way ANOVA, Tukey HSD Test, Educational Equity

1. INTRODUCTION

Socioeconomic status (SES) remains one of the most powerful and persistent predictors of student academic achievement in mathematics education worldwide. In basic education, mathematical mastery is recognized not only as an essential cognitive skill but also as a vital gateway to higher educational pursuits, technological literacy, and economic mobility. However, empirical literature consistently demonstrates that students from socioeconomically disadvantaged backgrounds face substantial barriers that hinder their academic growth compared to their economically privileged peers (Sirin, 2005; Reardon, 2011).

Previous research has consistently demonstrated a strong association between socioeconomic status and academic achievement. For instance, a meta-analysis by Sirin (2005) found that students from higher socioeconomic backgrounds tend to outperform their peers from lower socioeconomic backgrounds in academic assessments, including mathematics achievement tests. Similarly, a longitudinal study by Duncan et al. (1998) highlighted the enduring effects of childhood socioeconomic disadvantage on later academic outcomes, underscoring the persistent inequalities embedded in the education system.

The influence of socioeconomic status on mathematics achievement operates through multiple mechanisms, encompassing both individual and contextual factors. Family income, parental education level, access to educational resources, neighborhood characteristics, and school quality are among the key determinants that shape students' academic trajectories

(Reardon, 2011; Reardon & Portilla, 2016). Students from disadvantaged socioeconomic backgrounds often face greater barriers to academic success, including limited access to high-quality instruction, inadequate learning environments, and socioemotional challenges arising from economic hardship (Reardon & Portilla, 2016; OECD, 2019).

Moreover, the intersectionality of socioeconomic status with other dimensions of diversity, such as race, ethnicity, and cultural background, further complicates the relationship between SES and academic performance (Fryer & Levitt, 2004; Steele, 1997). Minority students from low-income families, for example, may experience compounded challenges due to systemic inequities and societal biases, leading to disparities in mathematical achievement (Gutiérrez et al., 2018; Lubienski et al., 2008).

According to the Barangay Malabog socioeconomic survey (2016), majority of students at Malabog National High School, Barangay Malabog, Paquibato District, Davao City are classified as having a low socio-economic status based on their family income. Out of the 2,527 households in Barangay Malabog, 2,200 households have a monthly income of less than Php 5,000.00. These households typically consist of farmers who own small farm lots, and they don't have enough financial means to provide chemicals, pesticides and fertilizers for their crops. Additionally, some students belong to indigenous communities are recipients of the Pantawid Pamilyang Pilipino Program (4Ps).

This research seeks to investigate the effect of socioeconomic status on students' academic performance in mathematics by examining the relationship between socioeconomic status and students' academic performance in mathematics in Grade 8 students at Malabog National High School for the School Year 2023 – 2024. Thus, through this research, the learners, parents, teachers, school administrators, and other stakeholders will gain an understanding of the significance, and effect of the socioeconomic status in relation to students' academic performance in mathematics.

1.1 Objectives of the Study

The purpose of this study is to determine the effect of socioeconomic status on students' academic performance in mathematics, specifically:

1. To assess the socioeconomic status of students; and

2. To determine the significant difference of students' academic performance in mathematics according to their socioeconomic status.

2. METHODOLOGY

The study was conducted at Malabog National High School, Division of Davao City, Malabog, Paquibato District, Davao City. There were 30 students of the study from Grade 8 – Galaxy, School Year 2023 – 2024. Their third grading grades in mathematics 8, and socioeconomic status were utilized as data of this study. Their socioeconomic status was determined based on their respective family monthly income (5,000 below: Low; 6,000 to 10,000: Average; 11,000 above: High).

Data on socioeconomic status of students and students' grades were assessed using the measure of central tendency and measures of variability of descriptive statistics, and while its effect on students' academic performance were analyzed using the Correlation Analysis (Pearson r), One – Way ANOVA, Tukey's HSD test.

Pearson correlation analysis assesses the strength and direction of the linear relationship between two continuous variables. In this study, Pearson correlation is used to examine the relationship between socioeconomic status and students' academic performance in Mathematics 8. The Pearson correlation coefficient (r) ranges from -1 to +1, where +1 indicates a perfect positive correlation, -1 indicates a perfect negative correlation, and 0 indicates no correlation.

One-way ANOVA is used to compare the means of two independent groups on a single dependent variable. In this study, one-way ANOVA was used to examine whether there are statistically significant differences in the mean academic performance in Mathematics 8 across different levels of socioeconomic status (low, average, high). If the ANOVA results indicate a significant difference, post-hoc tests using Tukey's HSD test were used to determine which specific groups differ from each other.

3. RESULTS AND DISCUSSION

The researcher conducted a survey in Grade 8 – Galaxy Students to determine their socioeconomic status. The student's family monthly income 5,000 below were classified as low socioeconomic status, 6,000 to 10,000 were classified as average socioeconomic status, and 11,000 above were classified as high socioeconomic status. Based on the results, majority of Grade 8 – Galaxy students in Malabog National High School were classified as low socioeconomic status according to their family monthly income.

Table 1. Students' Grades according to Socioeconomic Status

Resp.	SES	Grade
1	Average	84
2	Low	78
3	High	95
4	Low	80
5	Low	83
6	Average	86
7	Average	82
8	Low	81
9	Low	75
10	Low	75
11	Low	79
12	Low	77
13	High	90
14	Low	86
15	Low	78
16	Low	78
17	Average	80
18	Low	76
19	Low	76
20	High	88
21	Low	85
22	Low	79
23	Low	79
24	Low	76
25	High	91
26	Average	87
27	Average	85
28	Low	78
29	Low	81
30	Low	76

Out of thirty (30) students, there were 17 students who got grades 75 to 80 and that was 57 percent. There were 10 students who got grades 81 to 89, and that was 33 percent. There were 3 students who got grades 90 above and that was 10 percent. Based on the results, majority of the students got low grades in mathematics.

Table 2. Summary Statistics between Grades and SES

SES	N	Mean	SD	Var
Low	20	79.0	3.06	9.37
Average	6	84.0	2.61	6.8
High	4	91.0	2.94	8.67

Based on the summary statistics presented in Table 2, it is evident that there is a notable variation in academic performance in Mathematics 8 among students classified into different socioeconomic status categories as High, Average and Low. The mean scores for Mathematics 8 differ across these categories, with students from higher socioeconomic status generally achieving higher mean scores compared to their counterparts from lower socioeconomic backgrounds. Specifically, students classified as belonging to the Low socioeconomic status category have a mean score of 79.00, while those in the Average Socioeconomic Status and High Socioeconomic Status categories have mean scores of 84.00 and 91.00, respectively. This indicates a clear trend of increasing mean scores with higher socioeconomic status. Furthermore, the standard error of the mean (SE Mean) is relatively consistent across the three socioeconomic status categories, suggesting that the observed differences in mean scores are unlikely to be due to random sampling variability alone. The variability in Mathematics 8 scores within each socioeconomic status category, as indicated by the standard deviation and variance, also provides valuable insights. While students in the high socioeconomic status have the highest mean score, they also exhibit the highest variability (StDev = 2.94, Variance = 8.67) compared to students in the low socioeconomic status (StDev = 3.061, Variance = 9.368) and Average (StDev = 2.61, Variance = 6.80) categories.

Table 3. Correlation Analysis Results (SES vs. Grades)

Variable	Pearson r	Sig.	N
Socioeconomic Status	1.0	-	30
Mathematics Grade	.828**	.000	30

Based on the correlation analysis results presented in Table 3, it is evident that there is a statistically significant and very strong positive correlation between socioeconomic status and academic performance in Mathematics 8 among Grade 8 students. The Pearson correlation coefficient (r) of .828** indicates a strong positive relationship between these two variables. Specifically, socioeconomic status and academic performance in Mathematics 8 exhibit a positive correlation of .828** ($p < .001$). This implies that as socioeconomic status increases, academic performance in Mathematics 8 also tends to increase. Conversely, lower socioeconomic status is associated with lower academic performance in Mathematics 8. This finding aligns with previous research highlighting the influence of socioeconomic factors on educational outcomes (Sirin, 2005; Reardon, 2011; Duncan et al., 1998; OECD, 2019).

Table 4. One–Way ANOVA Results (SES vs. Grades)

Source	SS	df	MS	F	Sig.
Between Groups	544.27	2	272.13	29.97	.000
Within Groups	245.2	27	9.08	-	-
Total	789.47	29	-	-	-

Based on the One-Way ANOVA results presented in Table 4, there is a statistically significant difference in students' academic performance in Mathematics 8 across different levels of socioeconomic status. The F-statistic of 29.966 indicates that the variation in students' grades can be attributed to the differences in socioeconomic status categories. Specifically, the between-groups variation (Sum of Squares = 544.267) is significantly higher than the within-groups variation (Sum of Squares = 245.200), with a p-value (Sig.) of .000, indicating a highly significant result. This suggests that the differences in mean grades between socioeconomic status categories (Low, Average, and High) are unlikely to have occurred by chance (Sirin, 2005; OECD, 2019).

Table 5. Post Hoc Tests (Tukey HSD) Multiple Comparisons

(I) SES	(J) SES	Mean Diff.	SE	Sig.
Low	Average	-5.200*	1.403	.003
Low	High	-12.200*	1.651	.000
Average	Low	5.200*	1.403	.003
Average	High	-7.000*	1.945	.004
High	Low	12.200*	1.651	.000
High	Average	7.000*	1.945	.004

Based on the results of the Tukey HSD post hoc tests presented in Table 5, significant differences in students' academic performance in Mathematics are observed across different levels of socioeconomic status. The mean differences between socioeconomic status categories (Low, Average, and High) provide insights into the magnitude of these differences and their statistical significance. For instance, the mean difference in Mathematics 8 grades between students classified as Low socioeconomic status and Average socioeconomic status is -5.200*, indicating that students from Low socioeconomic status score, on average, 5.200 points lower than their peers from Average socioeconomic status. Similarly, the mean difference between Low and High socioeconomic status is even more substantial at -12.200*, suggesting a significant gap in academic performance between these two groups (Reardon, 2011; OECD, 2019).

4. CONCLUSION

Based on the results, findings, and discussions provided, it is evident that socioeconomic status significantly influences students' academic performance in Mathematics. The research clearly demonstrates that students from high socioeconomic status have a better performance in mathematics compared to students from low socioeconomic status.

5. RECOMMENDATIONS

As the research on 'The Effect of Socioeconomic Status on Students' Academic Performance in Mathematics' unfolds, it becomes increasingly apparent that socioeconomic factors play a crucial role in shaping students' educational outcomes. The preceding sections of this study have elucidated the significant impact of socioeconomic status on students' academic performance in Mathematics, highlighting disparities in achievement across different socioeconomic backgrounds. Building upon these findings, it is imperative to provide actionable recommendations aimed at addressing the identified challenges and promoting equitable access to quality education for all students:

• Implement targeted interventions: Schools should implement targeted interventions such as tutoring programs, mentorship initiatives, and

academic support services to assist students from disadvantaged socioeconomic backgrounds in improving their academic performance in Mathematics 8.

• Provide access to resources: Schools should ensure equitable access to educational resources, including textbooks, technology, and supplementary materials, to support the learning needs of students from low socioeconomic backgrounds.

• Foster parental involvement: Schools should actively engage parents and guardians in their children's education by providing information about academic progress, offering workshops on effective parenting strategies, and facilitating communication between home and school.

• Offer socioemotional support: Schools should provide socioemotional support services, such as counseling and mental health resources, to address the unique challenges faced by students from disadvantaged socioeconomic backgrounds and promote overall well-being.

• Advocate for policy change: Educational policymakers and stakeholders should advocate for policy changes aimed at reducing socioeconomic disparities in education, including increased funding for schools serving low-income communities and implementation of equity-focused initiatives.

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