Factors Affecting Students Academic Performance in Mathematics: A Comparative Study between Boarding and Non-Boarding Secondary Schools in Monduli District, Tanzania

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Abstract

The aim of this research was to investigate the factors impacting Mathematics achievement in secondary schools within Monduli District. The study focused on four secondary schools: Moringe, Orkeeswa, Engutoto, and Irkisongo. It tested three hypotheses: first, whether there's a notable link between teachers' qualifications and academic performance in Mathematics across boarding and day secondary schools in Monduli District (H1); second, whether socio-economic factors significantly affect academic performance in Mathematics in these schools (H2); and third, whether there's a significant relationship between the school environment and academic performance in Mathematics in both boarding and day secondary schools in Monduli District (H3). The research employed a correlational research design and gathered data through a self-administered questionnaire. Statistical analysis was conducted using the Statistical Package for Social Scientists (SPSS), employing techniques like independent t-tests to explore demographic variations in students' math performance. Additionally, Karl Pearson's Linear Correlation Coefficient and Multiple Regression Analysis were used to assess correlations between teachers' qualifications, socio-economic factors, school environment, and students' academic performance. The findings supported hypothesis one (H1) but did not support hypotheses two (H2) and three (H3). Furthermore, the study revealed no significant performance difference between boarding and non-boarding students. Consequently, it concluded that socio-economic factors and the school environment didn't notably correlate with students' academic performance, suggesting they shouldn't receive significant emphasis.

Instead, the study emphasized the importance of teachers' qualifications, which were identified as the sole predictor significantly influencing students' math performance in the surveyed secondary schools in Monduli District

Keywords. Academic Performance in Mathematics, Boarding and Non-Boarding, Secondary Schools, Comparative Study

Background of the Study

Mathematics is widely acknowledged for its pivotal role in the advancement of science and technology, making it an integral part of global culture evident in everyday life. It holds direct correlations with other subjects, particularly technical and scientific disciplines. Moreover, Mathematics is a compulsory subject across primary and secondary education. Tshabalala and Ncube (2013) assert that Mathematics serves as the foundation and an essential tool for the scientific, technological, and economic progress of any nation.

Davies and Hersh (2012) further emphasise the significance of Mathematics, not only in attaining academic qualifications but also in preparing students for their future endeavours, regardless of their chosen career paths. For any nation to remain relevant, it must recognise the importance of Mathematics within its educational framework. Thus, Mathematics stands as an indispensable component without which education and human life would function less effectively. In Tanzania, Mathematics holds significant importance within the curriculum and educational policies, spanning from primary to tertiary levels. It is a mandatory subject for admission to any tertiary institution in Tanzania (Galabawa, 2000).

Despite the vital role of Mathematics in individual and national development, student performance in the Certificate of Secondary Education Examination (CSEE) has been consistently declining over the past fifteen years. Mathematics consistently ranks as the poorest-performing subject, closely followed by English. For instance, the 2014 Form Four National Examination revealed poor performance in basic Mathematics compared to other subjects (NECTA, 2014). Zaya (2014) notes that only 17.8% of students who sat for the National Form Four Examinations in 2013 passed Mathematics.

The International Mathematical Union (IMU, 2009) highlights that poor performance in Mathematics is a significant concern among educators. The difficulty students face in understanding Mathematics has been attributed to their underperformance in the subject. Studies such as those conducted by Hill, Rowan, and Ball (2014) on the impact of teachers' mathematical knowledge on student achievement, Jonathan and Komba's (2014) research on factors influencing academic performance in ward secondary schools, and Emilio's (2011) study on the academic performance of community and government-built secondary schools, have shed light on various factors affecting student performance.

However, none of these studies were specifically conducted in the context of Monduli district, nor did they directly explore the relationship between teachers' qualifications, socio-economic factors, school environment, and students' academic performance in Mathematics. This study aims to address these gaps.

Theoretical Literature

The theory adapted for this study was derived from the System's theory input-output model developed by Bertalanffy in 1956. The theory, according to Koontz and Weihrich (1988) postulates that "an organized enterprise does not exist in a vacuum; it is dependent on its environment in which it is established. They add that the inputs from the environment are received by the organization, which then transforms them into outputs". As adopted in this study, the students (Inputs) are admitted into the secondary schools, from different socioeconomic backgrounds and are from various school environments, when they get into the school system, the teachers transform them through the process of teaching and learning, and the student's output is seen through their academic performance. An organization is increasingly described as absorbers, processors, and generators, and the organizational system could be envisioned as made up of several interdependent factors. System advocates, according to Robbins (1980) have recognized that a change in any factor within the organization has an impact on all other organizational or subsystem components. Thus the inputs, the processors, and the generators should function well to achieve the desired outcome. Saleemi (1997) in agreement with Robbins (1980) argued that all systems must work in harmony to achieve the overall goals. According to the input-output model, it is assumed that the students with high

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socioeconomic backgrounds and good school backgrounds will perform well if the school facilities are good, the teachers and the management of the secondary schools is good which may not always be the case and this is the shortcoming of this theory. According to Oso and Onen (2005) "the interrelationships among parts of a system have to be understood by all parties involved". This theory requires a shared vision so that all people in the school have an idea of what they are trying to achieve

from all parties involved, a task that is not easy to achieve.

Methodology

Research Design: The research adopted a correlational research design as it aimed to explore the connections between teachers' qualifications, socioeconomic status, school environment, and students' academic performance in Mathematics. As noted by McMillan and Schumacher (2006), correlation research examines the existing relationships between variables. Employing a quantitative approach was deemed appropriate as it involved variables that could be quantitatively measured and analysed using statistical methods

Population:

Borg and Gall (1989) define the target population as encompassing all individuals or elements, both actual and hypothetical, that an investigator seeks to generalize the findings of a research study to. In this particular study, conducted in the Monduli district, the target population includes students, teachers, and the District Secondary Education Officer (DSEO). Monduli district comprises 20 secondary schools with a total of 576 teachers. These groups were selected because of their pivotal roles within the school system, possessing valuable insight

into students' performance in Mathematics during the Certificate of Secondary Education Examination (CSEE**).**

Sample Size :

Mugenda and Mugenda (2003) describe a sample as a small population of the target population selected systematically from the study. The accessible population in Monduli district is of about 100 teachers and 300 students. Krejcie and Morgan (1970)'s table of sample size(s) determination, suggests that if one has a population of size, N = 300 units, one needs a minimum sample size, s = 169. Therefore, for this study, the researcher used a sample of 169 students. The sampled population is divided into four schools namely Manyara, Lowassa, Engutoto, and Irkisongo. The sample was divided into all four schools. Thus, from each school, at least 169/4 = were served as respondents.

Sampling Technique:

The sample for this study comprised 169 students selected from four specific secondary schools in Monduli district. The decision to have 169 respondents was guided by the sampling table provided by Krejcie and Morgan (1970), which assists in estimating the appropriate sample size. The study utilized both simple random sampling and purposive sampling techniques. Simple random sampling was employed to ensure fairness and prevent bias, ensuring each student had an equal chance of being chosen. As Amin (2005) suggests, randomization creates equivalent representative groups across all relevant variables as identified by the researcher.

Purposive sampling was utilized to select respondents because the focus was specifically on Form Four students. Regarding data collection methods, given the correlational, cross-sectional nature of the survey involving a large number of participants, the study employed the survey method. This approach enabled the researcher to gather data from the sample over a period, as outlined by Amin (2005). Data collection was conducted through self-administered questionnaires (SAQs), chosen for their efficiency and cost-effectiveness in covering all respondents, as noted by Sekaran (2003). Additionally, SAQs were deemed suitable due to the proficiency of sampled respondents in the English language, the language used in the questionnaires.

Data Analysis Technique:

Data from questionnaires and interview guides was compiled, sorted, edited, classified, and coded into a coding sheet and analyzed using a computerized data analysis package known as Statistical Package for Social Science (SPSS) 16.0. The collected data was analyzed both quantitatively and qualitatively. The qualitative data collected from teachers and DSEO was used as a supplement to the data collected through questionnaires. The data collected from students through a questionnaire (the quantitative one) was processed and analyzed using SPSS. Descriptive statistics was used and the results were presented in the form of percentages, means, standard deviations, and frequencies. All numerical variables such as the aggregate index on teacher qualifications, socioeconomic factors, and school environment analysis will be univariate, targeting one variable at a time. Inferential data analysis was used; bivariate analysis to test the hypothesis that correlated each numerical independent variable (teacher's qualifications, socio-economic factors, and school environment) with the numerical dependent variable (student's performance in Mathematics) using Karl Pearson's Linear Correlation Coefficient. Also, multivariate analysis was used to test all three hypotheses at once using multiple linear regressions. The researcher also used the t-test to find out how academic performance in Mathematics varied with school-type boarding and non-boarding. Finally, data were presented and interpreted, and conclusions and recommendations were drawn based on the used by analyzed data.

Validity of the Research Instrument:

Validity means that correct procedures were applied to find answers to a question. To achieve validity in the instruments of data collection, the instruments are initially prepared by the researcher and checked by the supervisor to comment on the extent to which the items were appropriate in securing relevant information to the research. Best and Kahn (2002) describe that "the items of the instrument should represent a significant aspect of the purpose of the investigation". Content validation was established by cross-referencing the content of the instruments to those elements contained in the conceptual framework of the study and the research questions that the study sought to answer. Validity looks at whether the instrument measures what it was intended to measure and whether the instrument draws accurate information. Also, The Content Validity Index (CVI) was used to calculate the validity of the

questionnaire. Twenty (20) items out of twenty-seven (27) were judged by both judges to be relevant. Therefore, 20/ 27 = 0.704, according to Schumacher and McMillan (2006) for the instrument to be acceptable as valid, the average index should be greater than 0.7. Thus, the instrument was considered valid in that the computed CVI of 0.704 was more than 0.7 recommended CVI on the survey instrument.

Reliability of the Research Instrument:

Reliability addresses the consistency of the instruments about what they intend to measure. The researcher ensured the reliability, of the instrument by pre-tested it. The items of teacher's qualifications, socio-economic factors, and school environment were tested using Cronbach Alpha. According to Schumacher and McMillan (2006), Cronbach's alpha greater than 0.7 (>0.7) indicates the reliability of the instrument. Therefore, the researcher established the reliability of the instrument to be used in this study by computing the alpha coefficient of the items.

Table 3.1: Cronbach's Alpha Values

Variable (s)	Scale	No. of Items	Cronbach's Alpha
Dependent Variable	Students' Academic Performance	6	0.678
Independent Variable	Teachers Education	6	0.709
	School Environment	5	0.687
	Socio-economic Factors	6	0.742

According to the statistical analysis Cronbach's alpha value range between 0.678 to 0.742. The overall reliability of scale items was found to be 0.740. The closer Cronbach's alpha was to 1, the higher the internal consistency of reliability of the instrument. Normally Cronbach's alpha

greater than 0.7 (>0.7) indicates the reliability of the instrument (Schumacher and McMillan 2006). Thus, all six measure scales on the self-administered questionnaire were found to be satisfactory and reliable to be used in the study.

Data Analysis, Interpretation, and Discussion

The variables looked at in the background are gender, age, subject combination, and school type. **Table 4.1: Distribution of Respondents by Gender**

Gender	Number of Students	Percentage
Female	83	48.8
Male	87	51.2
Total	170	100.0

Table 4.1 shows that almost 51.2% of students were male and 48.8% were female. This suggests that the majority of students were male in the surveyed secondary schools in Monduli district. This male dominance can be attributed to a culture of majority ethnic groups in Tanzania who favor the provision of education for boys rather than girls.

Table 4.2: Distribution of Respondents by Age Group

Age group (years)	Number of Students	Percentage
Less than 13 years	9	5.3
Above 13 years	161	94.7
Total	170	100.0

Table 4.2 shows that 94.7% of respondents fall within the above 13 years age group and only 5.3% of the respondents fall within less than 13 age group. This suggests that the majority of students were young and the appropriate age for 'O' level students.

Table 4.3: Distribution of Respondents by Subject Combination

Subject combination	Number of Students	Percentage
Science	123	72.4
Art	47	27.6
Total	170	100.0

Table 4.3 shows that almost 72.4% of students were studying science subjects whereas 27.6% of their counterparts were studying arts subjects. This suggests that the majority of students in the surveyed schools were studying science. This science dominance might be attributed to the government's emphasis on science subjects in recent years.

Table 4.4: Distribution of Respondents by School Type

School Type	Numbers of Student	Percentage
Boarding	142	83.5
Non-boarding	28	16.5
Total	170	100.0

Table 4.4 displays that 83.5% of students were boarding scholars whereas 16.5% of students were non-boarding scholars. This suggests that the majority of students in the surveyed secondary schools in Monduli district were boarding scholars. This reflects that almost all secondary schools in Monduli were boarding schools.

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Description of the Dependent Variable: Students' Academic Performance

The dependent variable of the study was Student's academic achievement. Likert scale rating was used ranging from one which represented very dissatisfied, two represented dissatisfied, three represented neutral, four represented satisfied and five represented very satisfied.

Table 4.5 illustrates the descriptive statistics of respondents' responses giving pertinent tables and means accordingly.

Table 4.5: Respondent self- rating on Students' Academic Performance

Students' academic performance items	Mean	Std. Deviation
My school performs well in national examinations every year	2.558	0.929
My school perform better in Mathematics than any other subject	1.976	1.014
I do not do Mathematics homework.	3.135	1.206
My performance is influenced by a lack of basic needs	2.823	1.217
My performance is influenced by a lack of reading materials	2.905	1.306

Table 4.5 results indicate that the item "My school performing well in national examinations every year" had a mean value of 2.558 thus suggesting that students were fairly satisfied with academic performance in Mathematics. About item "My school performed better in Mathematics than any other subject," had a poor mean value of 1.976. This poor rating suggests that students were not satisfied with mathematics performance (poor mathematics performance) compared to other subjects. The item "I do not do Mathematics homework," had an average mean value of 3.135 thus implying that students were average satisfied by the way they do homework. On item "My performance is influenced by lack of basic needs," Table 4.5 displays the average mean value of 2.823. This fair rating on the influence of basic needs on students' academic performance implies that basic needs fairly influence student academic performance in mathematics. Regarding item "My performance is influenced by lack of reading

materials" had a mean value of 2.905 thus suggesting that students were fairly satisfied that lack of reading materials influenced their mathematic performance. To give an overall picture of how students rated themselves on academic performance in mathematics subject, an average index ("Studacp" to imply students' academic performance in mathematics) was computed from the five statements/items in Table 4.5 and Table 4.6 giving pertinent descriptive statistics:

Table 4.6: Descriptive statistics on students' Responses on Student's Academic Performance

Statistics		**Value**
Mean		2.680
95% confidence interval	Lower bound	2.597
	Upper bound	2.762
Minimum		1.40
Maximum		4.40
Range		3.0

According to Table 4.6, mean values were 2.680 with a confidence interval of 2.597 to 2.762 at the 95% level corresponding with a poor rating of student's academic performance. Table 4.6 reveals that some students scored poorly a minimum of 1.40 while others scored best which is a maximum of 4.40. This gave a big difference as mirrored by a high range of 3.0. This poor rating on students' academic performance in Mathematics in the surveyed secondary schools in Monduli is also supported by the views obtained qualitatively. For example, head teachers responded to the question "How would you comment on the general students' performance in your school, and what is the general students' academic performance in your school in recent years do you communicate to your teacher" as follows:

"The general performance of the students in my school is not good; most of the students fail their examinations". "The general performance of my students in my school is not good at all".

Such views clearly show that surveyed secondary schools had poor performance in general.

Variation of students' academic performance with the gender of the respondent

This section is interested in establishing whether the gender of the respondent has a relationship with one's students' academic performance. Table 4.7 shows t-test results in variation of students' academic performance among male and female students in the surveyed schools in Monduli district.

Table 4.7: Descriptive statistics and student t-test on how gender relates to students' academic performance

Categories of gender	Sample size	Sample mean	Std. deviation	T	Sig
Female	83	2.713	0.521	0.570	0.441
Male	87	2.648	0.571		

According to the means in Table 4.7 students' academic performance differed slightly with the gender of the respondent with males having higher academic performance (mean =2.713) than females (mean = 2.648). Also, Table 4.7 indicates t-value of 0.570 whose sign = 0.441which is greater than popular $\alpha = 0.05$. This implies that the gender of the respondent had no significant relationship with one's academic performance at a five percent level of significance.

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Table 4.8: Descriptive statistics and student t-test on how age relates to students' academic performance

Categories of age group	Sample size	Sample mean	Std. deviation	T	Sig
Less than 13 years	9	2.600	0.600	-0.408	0.684
Above 13 years	158	2.675	0.539		

Means in Table 4.8 suggests that the student's academic performance in mathematics differs with the age group. Students who fell under thirteen years had the highest academic performance (means = 2.675) than those who fell under less than thirteen years (mean =2.600). The t value was -0.408 and its Sig = 0.684 which is far greater than $\alpha = 0.05$ implying that the student's age did not differ significantly from the student's academic performance in mathematics in the surveyed secondary schools in the Monduli district at the five percent level of significance.

Table 4.9: Descriptive statistics and student t-test on how study combination relates to students' academic performance

Categories of Combination	Sample size	Sample mean	Std. deviation	T	Sig
Science	123	2.691	0.561	0.465	0.671
Art	47	2.651	511		

From the means in Table 4.9 students' academic performance differed slightly with students study combination with science having higher academic performance (mean = 2.691) than Art

(mean = 2.651). Also, Table 4.9 indicates a t-value of 0.465 whose sign = 0.671 which is greater than popular α = 0.05. This implies students' study combination did not differ significantly from the students' academic performance in mathematics in the surveyed secondary schools in the Monduli district at the five percent level of significance

Table 4.10: Descriptive statistics and student t-test on how school type relates to students' academic performance

Categories of school type	Sample size	Sample mean	Std. deviation	T	Sig
Boarding	142	2.683	0.560	1.234	0.268
Non boarding	28	2.664	0.483		

Means is Table 4.10 suggests that the student's academic performance in mathematics differs slightly from the school categories. Students in boarding schools had the highest academic performance (means = 2.683) than those in non-boarding (mean = 0.483). The t value was 1.234 and its Sig = 0.268 which is far greater than α = 0.05 inferring that the student's student school categories did not differ significantly from the student's academic performance in mathematics in the surveyed secondary schools in the Monduli district at the five percent level of significance.

Description of the independent variable: Factors Influencing Students' Academic Performance

Factors were the independent variable in the study conceptualized as; teachers' qualifications, socioeconomic factors, and school environment.

Teachers' Qualifications- Teachers' qualifications constituted six items, where respondents were asked to rate themselves on how the items applied to them using a Likert scale ranging from one to five. One presented strongly disagree, two presented disagree, three presented

undecided, four presented agree and five presented strongly agree. Table 4.10 shows pertinent means and standard deviations:

Table 4.11: Respondents self-rating on teachers' qualifications

Teachers' qualifications items	Mean	Std. Deviation
My school lacks qualified Mathematics teachers	2.805	1.516
My mathematics teacher has more than 30 lessons per week	2.282	1.377
I don't understand my Mathematics teacher when he/she is teaching	2.600	1.342
My mathematics teacher completed the syllabus in time before the end of the term and national examinations.	3.105	1.451
My mathematics teacher used to value teaching codes of conduct all the time	3.482	1355
Generally, My mathematics is highly committed to his/her work	3.682	1.382

Table 4.11 shows that average mean value of 2.805 proposing that the surveyed secondary schools in Monduli had fair qualified mathematics teachers. Looking at the item "My mathematics teacher has more than 30 lessons per week," Table 4.11 exposes that low mean value of 2.282 signifying that mathematics teachers in the surveyed secondary schools had a fair teaching load per week. On item "I don't understand my Mathematics teacher when he/she is teaching," Table 4.10 shows that the students fairly understood Mathematics teachers with a fair mean value of 2.600. Also, Table 4.10 shows that the teachers were fair and completed the syllabus in time before the end of the term and national examinations. This is confirmed by an average mean value of 3.105. About item "My mathematics teacher used to value teaching codes of conduct all the time," had a high mean value of 3.482. This good rating suggests that teachers in the surveyed secondary schools in Monduli were fairly observed teaching codes of conduct all the time. The item "Generally, My mathematics is highly committed to his/her work," had a high mean value of 3.682 thus implying that mathematics teachers in the surveyed

secondary schools in Monduli were highly committed to their work. To have an overall picture of how students in the surveyed secondary school rated themselves on teacher's qualification an average index ("Teaqual" to mean teachers' qualifications) was computed from six items in Table 4.11 and Table 4.12 gives pertinent descriptive statistics:

Table 4.12: Descriptive statistics on students' Responses to teacher's qualifications

Statistics		**Value**
Mean		2.993
95% confidence interval	Lower bound	2.900
	Upper bound	3.085
Minimum		1.17
Maximum		4.33
Range		3.17

Table 4.12 shows that the mean value was 2.993 with a confidence interval of 2.900 to 3.085 at the 95 % level reflecting to fair rating of teacher's qualifications. Table 4.12 reveals that some students scored very poor a minimum of 1.17 while others scored best a maximum of 4.33. This gave a big difference as mirrored by a high range of 3.17. This average of teacher's qualifications is mirrored by the views collected qualitatively. For instance, head teachers responded to the question "How would you comment on a teacher's qualification in mathematics subject about student academic performance" as follows:

> "All mathematics teachers in my school are diploma holders, this may explain the performance of students in mathematics subject, thus government should provide them on the job training," Majority of mathematics teachers in my school are diploma holders.

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These views evidently that teachers' education somewhat influences students' academic performance in mathematics subjects in surveyed secondary schools in the Monduli district.

Socio-economic factors. Socio-economic factors constitute six items, where respondents were asked to rate themselves on how the items applied to them using a Likert's scale ranging from one to five. One presented strongly disagree, two presented disagree, three presented undecided, four presented agree and five presented strongly agree. Table 4.12 shows pertinent means and standard deviations

Table 4.13: Respondents Self-rating on Socio-economic Factors

Socio-economic Factors	Mean	Std. Deviation
My parent's education affects my performance in Mathematics subject	2.188	1.393
Distance from home to school affects students' performance in Mathematics my school	2.535	1.456
Lack of learning materials tends to poor performance in Mathematics in my school.	2.941	1.442
Sometimes I do not attend Mathematics lessons because of family chores	2.694	1.553
Truancy negatively affects students' performance in Mathematics in my school	3.747	1.341
My parents/guardians cooperate with teachers to advise me to study Mathematics	3.552	1.463

Table 4.13 shows that a poor mean value of 2.188 proposes that a student's parent's education somewhat affects a student's performance in Mathematics. Looking at the item "Distance from home to school affects students' performance in Mathematics my school," Table 4.13 exposes that average mean value of 2.535 signifying that students in the surveyed secondary schools in

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the Monduli district have fairly agreed that distance from home to school affects their performance in Mathematics. On item “Lack of learning materials tends to poor performance in Mathematics in my school," Table 4.13 shows that the student's fairly performance in mathematics attributed to lack of learning materials online with a fair mean value of 2.941. Also, Table 4.13 shows that the students were fair agreed that they don't attend Mathematics lessons because of family chores. This is confirmed by an average mean value of 2.694. The item “Truancy negatively affects students' performance in Mathematics in my school," had a mean value of 3.747 suggesting truancy negatively affects students' performance in Mathematics in the surveyed secondary schools in the Monduli district. Regarding the item "My parents/guardians cooperate with teachers to advise me to study Mathematics,” Table 4.13 shows that the students highly agreed that their parents/guardians cooperate with teachers to advise them to study Mathematics online with a high mean value of 3.552. To have an overall picture of how students in the surveyed secondary schools rated themselves on socio-economic factors an average index (“Socioecon" to mean parents' socio-economic factors) was computed from four items in Table 4.13 and Table 4.14 gives pertinent descriptive statistics:

Table 4.14: Descriptive statistics on students’ Responses on Socio-economic Factors

Statistics		**Value**
Mean		2.943
95% confidence interval	Lower bound	2.831
	Upper bound	3.054
Minimum		1.00
Maximum		5.00
Range		4.00

Table 4.14 shows that the mean value was 2.943 with a confidence interval of 2.831 to 3.054 at the 95 % confidence interval level reflecting to fair rating on parent socio-economic factors.

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Table 4.14 reveals that some students scored very poor is a minimum of 1.00 while others scored best is a maximum of 5.00. This gave a big difference as mirrored by a high range of 4.00. The fair rating on parent socio-economic factors in Mathematics in the surveyed secondary schools in Monduli is also supported by the views obtained qualitatively. For example, head teachers responded to the question "Could you please tell me how parents' socio-economic status influences their academic performance in mathematics subject in your school" as follows:

> "Many of our students come from villages where some of their parents are very poor and others do not know the importance of education to their children. We have a student in form four C whose father trying to refuse him to proceed with school but trying a lot right the student is proceeding with school," The general parent socio-economic status has some negative impact on students' academic performance in my school."

These views that parent socio-economic status influences students' academic performance in mathematics subjects in surveyed secondary schools in Monduli district.

School Environment- School Environment constitutes five items, where respondents were asked to rate themselves on how the items applied to them using a Likert scale ranging from one to five. One presented strongly disagree, two presented disagree, three presented undecided, four presented agree and five presented strongly agree. Table 4.15 shows pertinent means and standard deviations:

Table 4.15: Respondents Self-rating on School Environment

School Environment	Mean	Std. Deviation
The lack of Mathematic laboratories in my school causes poor performance in the subject	2.982	1.593
Overcrowded classes cause poor performance in Mathematics in my school.	3.047	1.533

Inadequate teaching and learning facilities cause poor performance in the mathematics subject in my school.	3.511	1.389
My performance in Mathematics is likely to be influenced by the poor study environment at school	3.217	1.481
Generally, the teaching and learning environment is good	2.976	1.503

The item “Lack of Mathematic laboratories in my school cause poor performance in the subject,” had an average mean value of 2.982 suggesting that the students agreed that the lack of mathematics laboratories caused their poor performance in mathematics. On item "Overcrowded classes cause poor performance in Mathematics in my school,” Table 4.15 shows that high mean value of 3.047 suggesting that the students fairly agreed that overcrowded classes caused their poor performance in Mathematics in the surveyed secondary schools in the Monduli district. The mean value of 3.511 on the item “Inadequate teaching and learning facilities cause poor performance in the mathematics subject in my school," shows that students have fairly agreed inadequate teaching and learning facilities caused their poor performance in the mathematics subject. On item “My performance in Mathematics is likely to be influenced by poor study environment at school," had a mean value of 3.217 suggesting that students agreed that a poor study environment at their school was influencing their academic performance in mathematics. Regarding to item “Generally, teaching and learning environment is good," had an average mean value of 2.976 suggesting that students fairly agreed that their schools had fair teaching and learning environment in general. To give an overall picture of how students in the surveyed secondary schools rated themselves on school environment an average index (“Scholenv” to imply school environment) was computed. Table 4.15 and Table 4.16 give descriptive statistics:

Table 4.16: Descriptive statistics on students' Responses to School Environment

Statistics		**Value**
Mean		3.147

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95% confidence interval	Lower bound	3.020
	Upper bound	3.273
Minimum		1.40
Maximum		5.00
Range		3.60

Table 4.16 indicates that students self-raring in the school environment, in general, was fair shown by a mean value of 3.17 with a confidence interval ranging from 3.020 to 3.273 at the 95% level. Table 4.15 also shows that some students scored very poorly is a minimum of 1.40 while others scored best is a maximum of 3.60. This gave a slight gap as revealed by a range of 2.67. This good rating is mirrored by the views collected qualitatively. For example, head teachers responded to the question "In your opinion does school environment affect students' performance in your school" as follows:

> "Our school environment affects our students' academic performance since we don't have a reliable source of water and a library," The School environment in my school affects students' academic performance positively simply because there reliable electricity power which provides room for my students to study during night."

These views show clearly that the school environment influences students' academic performance in mathematics subjects in surveyed secondary schools in Monduli district.

Overall Factors- To give an overall picture of how respondents rated themselves on the factors for academic performance in mathematics in totality an average index (Factors) to mean factors influencing student academic performance in mathematics was computed from three measures of factors is teacher's qualifications (Teaqual), socio-economic (Socioecon) and school environment (Scholenv). Table 4.16 gives pertinent descriptive statistics:

Table 4.17: Descriptive statistics on students' Responses to School Environment

Statistics		**Value**
Mean		3.027
95% confidence interval	Lower bound	2.956
	Upper bound	3.099
Minimum		1.82
Maximum		4.49
Range		2.67

Table 4.17 it indicates that students self-raring in the school environment in general was fair shown by a mean value of 3.027 with a confidence interval ranging from 2.956 to 3.099 at the 95% level. Table 4.15 also shows that some students scored very poorly which is a minimum of 1.82 while others scored best which is a maximum of 4.49. This gave a slight gap as revealed by a range of 2.67.

Preliminary Testing of Hypotheses

This section deals with the testing of three study hypotheses and presents the results on how independent variables: teachers' qualifications, school environment, and socio-economic factors relate to the dependent variable students' academic performance.

Hypothesis One

One hypothesis of the study stated that “there is no significant relationship between teacher’s qualification and academic performance in Mathematics in boarding and day secondary schools in Monduli." To test this, the two numerical indices (Teaqual and Studacp) were correlated using Pearson's Linear Correlation index. Table 4.16 gives the pertinent results.

Table 4.18: Pearson's Linear Correlation between Teacher's Qualification and Academic Performance in Mathematics

		Academic Performance	Teachers Qualifications
Academic Performance	Pearson Correlation	1	0.993
	Sig. (2-tailed)		-0.001
	N	170	170
Teachers Qualifications	Pearson Correlation	0.993	1
	Sig. (2-tailed)	0.001	
	N	170	170

* *Correlation is significant at the 0.05 level (2-tailed).

According to Table 4.18, the correlation between teachers' qualifications and students' academic performance using the Persons linear correlation coefficient gave r = 0.993 and its Sig = -0.001 which is far less than α = 0.05. The computed Sig (-0.001) suggests that teachers' qualifications and students' academic performance were negatively linearly correlated, thus preliminary acceptance of the research hypothesis that, there was a significant relationship between teachers' qualifications and academic performance in Mathematics in boarding and day secondary schools in Monduli. Does this finding confirm the previous report of some studies of Godlhaber and Brewer's (2000**)** study on doe's teacher certification matter? High school teachers' certification status and student achievement found that teachers who have a standard certification have a statistically significant positive impact on students' test scores relative to teachers who don't hold certification in their subject area. Similarly, King (2003) Teachers Quality: Understanding the Effectiveness of teachers attributes found that, teachers who have earned advanced degrees have a positive impact on high school Mathematics and Science achievement when degrees earned are in these subjects. Adeyeye, Yashe, and Aliyu (2013) study on the effect of teachers' qualifications on performance in further mathematics

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among secondary school students in Kaduna State, Nigeria found that a significant difference exists between students' performance on account of their teacher's qualifications. Umeobika, Dike, Abugu and Unanma (2013) relationship between teachers' educational qualifications and students achievement in Chemistry in Owerri West LGA found a positive relationship between teachers' academic qualifications and students' academic achievement. , Fakeye (2012) in his study on teachers' qualifications and subject mastery as predictors of achievements in the English language in Ibarapapa Division of Oyo State, Nigeria found that teachers, teaching qualifications have a significant relative contribution to students' academic achievement in the English language. Similarly, Mogari, Kriek, and Stols (2009) on Esotho's student's achievement in mathematics and their teacher's background and professional development found that teacher qualification had the strongest significant relationship with student academic achievement. However, Tella (2008) study on teacher variables as predictors of academic achievement of primary school pupils' mathematics found that teachers' qualifications and experience did not significantly correlate with pupil's achievements in mathematics.

Hypothesis Two

The second hypothesis in the study was that "there is no significant relationship between socio-economic factors and academic performance in Mathematics in boarding and day secondary schools in Monduli" Using responses under socio-economic factors only, the two numerical variables (Socioecon and Studacp) were correlated using Pearson's linear correlation coefficient as shown in Table 4.19

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Table 4.19: Pearson's Linear Correlation between Socio-economic Factors and Academic Performance in Mathematics

		Academic Performance	Socio-economic
Academic Performance	Pearson Correlation	1	0.606
	Sig. (2-tailed)		-0.040
	N	170	170
Socio-economic	Pearson Correlation	0.606	1
	Sig. (2-tailed)	-0.040	
	N	170	170

** Correlation is significant at the 0.01 level (2-tailed).

Results in Table 4.19 show that the correlation between socio-economic factors and students' academic performance in Mathematics using Pearson's linear correlation coefficient statistics indicated r = 0.606 whose Sig = -0.040 which is far less than popular α = 0.05 suggesting preliminary acceptance of the research hypothesis that there was significant relationship between socio-economic factors and academic performance in Mathematics in boarding and day secondary schools in Monduli at five level of significance. This finding corresponds with the findings by Salamah (2012) that the impact of social and economic factors on students' English in EFL classrooms in Dubai public secondary schools found a significant and positive correlation between the parent's level of education, income, and occupation with pupils' educational performance. Also, Juma, Simatwa, Enose, and Ayodo (2012) impact of Family socioeconomic status on female students' Academic Achievement in Secondary Schools in Kenya found that the study established that the girl students from high family income

performed better than those from low-income families and parents with high of education greatly enhanced girl students' academic achievement. Wambugu, Parsitau, and Muandu (2015) influence of parents' economic status on girls' academic performance in mixed-day secondary schools in Kenya found that parents' economic status influenced girls' academic performance in mixed-day secondary schools. Equally, Adesina and Okewole (2014) correlated socioeconomic background and academic performance among senior secondary school Government students using an advanced organizer learning strategy and found that there was a significant difference between the academic performance of students from low socio-economic groups and those from middle socio-economic class. Onweazu (2010) found a significant effect of the education status of parents on the educational achievement of female children

Hypothesis Three

The third hypothesis in the study was "there is no significant relationship between school environment and academic performance in Mathematics in boarding and day secondary schools in Monduli District" To confirm this, the two variables (Scholenv and Studacp) were correlated using Pearson's linear correlation as in Table 4.20:

Table 4.20: Pearson's Linear Correlation between School Environment and Academic Performance in Mathematics

		Academic Performance	School Environment
Academic Performance	Pearson Correlation	1	0.492
	Sig. (2-tailed)		0.053
	N	170	170
School Environment	Pearson Correlation	0.492	1
	Sig. (2-tailed)	0.053	

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N	170	170

**. Correlation is significant at the 0.01 level (2-tailed)

According to Table 4.18 the correlation between school environment and academic performance in Mathematics using Persons linear correlation coefficient gave r = 0.492 and its Sig = 0.053 which was less than α = 0.05 suggesting preliminary acceptance of the research hypothesis that there is no significant relationship between school environment and academic performance in Mathematics in boarding and day secondary schools in Monduli District at five level of significance. Osena (2007) who studied the factors affecting student performance in mathematics of secondary school students in Uasin Gishu district, Kenya found similar relationships in their analysis that the learning environment was poor in terms of facilitating student performance in Mathematics. Abubakar and Usaini (2015) on the influence of school environment on the academic performance of secondary school students in Kuala Terengganu, Malaysia found that the result of the study indicated that students from a school with adequate facilities, good, teachers, and a favorable environment perform well than those from schools with fewer facilities, unqualified teachers and the less enabling environment. Similarly, Dondo, Ivagher, Angelina, and Odeh (2015) influence of school environment on the academic achievement of students in secondary schools in the zone "A" senatorial district of Benue State, Nigeria found that school climate, discipline, and physical facilities have a significant influence on academic achievement of secondary school students in Zone 'A' Senatorial District of Benue State. Further, Paredes, Manzi, and Gazimuri (2015) classroom discipline, classroom environment, and student performance in Chile found that the overall school environment is a better predictor of students' test results than the environment in the classrooms of the students.

Confirmatory Testing of Hypotheses

Preliminary analysis was conducted in section 4.5 pending for confirmatory testing hypothesis using multiple regression analysis. The multiple regression analysis was conducted to find out whether independent variables Teachers' qualifications, socio-economic factors, and school environment together predict dependent variable students' academic performance in Mathematics. Also, the researcher was interested in finding out the best predictor variable (s)

of student's academic performance in Mathematics in boarding and day secondary schools in the Monduli district among the three predictors. Regression analysis results are given in Table 4.19, Table 4.20 and Table 4.21.

Table 4.21: Mode Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.76[a]	0.006	-0.012	55045

The value of the Adjusted R square in Table 4.19 was -0.012 which is approximately 24% amount of variation in students' academic performance in Mathematics explained by the independent variables. The rest of the % of the amount of variation in job satisfaction was explained by other independent variables not considered in the study.

Table 4.22: Regression Model Summary

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	0.294	3	0.098	0.323	0. 808[a]
	Residual	50.298	166	0.303		
	Total	50.592	169			

ANOVA results in Table 4.20 give an F statistic = 0.323 and its Sig value of 0.808 which is far greater than $\alpha = 0.05$. The computed Sig (0.808) implies that the independent variables did not contribute positively significantly to variation in the dependent variable. This also suggests that the model was significantly fit at the 1 % significance level.

Table 4.23: Regression Coefficient

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.658	0.287		9.272	0.000
School Environment	-0.037	0.052	-0.056	-0.704	0.483
Teachers Qualifications	-0.003	0.069	-0.004	0.048	0.04
Socio-economic	0.050	0.060	-0.067	0.839	0.402

Table 4.21 indicates that the computed Sig (p) value for the independent school environment and socio-economic factors = 0.483 and 0.402 which were far greater than a popular Sig = 0.05 suggesting that school environment and socio-economic factors were not significantly correlated with Students' academic performance in Mathematics at the five percent significance level. Further, Table 4.21 reveals that teachers' qualifications had a significance level of 0.04 which is less than 0.05, suggesting a significant correlation with dependent variable students' academic performance in Mathematics. Thus, teachers' qualifications were found to be the only predictor of students' academic performance in Mathematics in surveyed secondary schools in Monduli district.

Summary, Conclusions, and Recommendations

Summary of the findings

The study aimed to identify factors affecting Mathematics performance in Monduli district secondary schools. Results showed that school environment and socio-economic factors were

not the best predictors of students' academic performance, but teacher qualifications were the only significant predictor.

Conclusion

The study found that teachers' qualifications significantly influenced students' academic performance in Mathematics in Monduli district secondary schools. Socio-economic factors were found to be essential for improving students' performance, but they had no significant impact. School environment was also found to be insignificant, suggesting that socio-economic factors and teachers' qualifications were more significant. Therefore, the study suggests that more emphasis should be placed on these factors, as they have a significant impact on students' academic performance.

Recommendation for action

The study suggests that the education administration in Monduli district should prioritize qualified teachers and provide in-service training to improve students' academic performance in Mathematics. However, the study found no significant correlation between socio-economic factors of parents and students' academic performance. The researcher recommends further research, considering other Tanzanian districts and regions, considering other subjects, and using a qualitative paradigm to gather respondents' opinions on students' academic performance.

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