



Original Article

Influence of Infrastructural Facilities and Staffing on Students' Academic Performance in National Secondary Schools in Kenya

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Date Published: **ABSTRACT**

14 Jun 2022 In 2011, the Kenya government made efforts to improve access to quality secondary education by increasing the number of national schools from

Keywords: 17 to 114. This was done by elevating two provincial schools in each county to national schools. This study sought to establish influence of infrastructural facilities and staffing on academic performance in national examinations in young national schools in Samburu, Marsabit, and Isiolo counties, Kenya. Correlation research design was used. The study population was 5 principals, 150 teachers, 3 examinations officers, and 3 staffing officers. The sample size was composed of 5 principals, 60 teachers, 3 examinations officers, and 3 staffing officers. The study established that infrastructural facilities and staffing had a positive and statistically significant relationship with academic performance in all the schools in the three counties as follows: Infrastructural facilities ($r=0.495$, $p\text{-value}=0.000$), Staffing ($r=0.372$, $p\text{-value}=0.05$), all at alpha 0.05 level of statistical significance. Further, multiple regression analysis revealed that infrastructural facilities had a positive significant impact on performance (2.008), while staffing also had a positive significant impact on performance (0.331) both at 5% level of significance. The schools were understaffed, lacked enough infrastructural facilities, and had congested classes. The government should post more teachers in those schools and improve infrastructural facilities in those schools to address the challenges.

Student Performance,
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Staffing,
Teacher-Student Ratio,
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INTRODUCTION

Education is universally viewed as one of the best paths for individuals to live better and more fruitful lives, as well as a major driver of the economy (Glennerster et al., 2011). Governments in the world have therefore strived to ensure they give quality education to their citizens. According to UNESCO (2021) quality education entails proper skills development, provision of significant school infrastructure, resources, and equipment as well as the teaching force.

There are four categories of secondary schools in Kenya; National, Extra- County, County, Sub-County and Private Schools (Ministry of Education, 2016). By 2011, there were 17 national schools. The government elevated more into national status that

year, making a total of 114 national schools in the country. National schools are considered the cream of public secondary schools. The government therefore aimed at improving access to quality secondary education.

Increasing the number of national schools in Kenya was a good move to improve access to quality secondary education. However, according to the Kenya Certificate of Secondary Education (K.C.S.E) examination results, the young national schools do not post good results. Data from several years shows that they have been consistently performing poorly. *Table 1* below gives a comparison in the academic performance of some the young national schools and the old national schools.

Table 1: Performance of some National Schools in KCSE examinations, 2011 – 2016

School/year	2011	2012	2013	2014	2015	2016
Section A: Young National schools						
Kisima Girls	5.44	5.32	5.47	6.0	6.6	4.68
Marallal High	7.12	7.41	7.70	7.94	7.71	6.5
Moi Girls	5.52	3.86	4.4	5.65	6.78	4.682
Moyale Boys	5.30	4.23	3.99	4.0	3.78	3.19
Garissa High	-	4.99	5.3	5.1	6.3	3.9
NEP girls	-	2.6	2.76	3.1	3.4	2.8
Isiolo girls		3.24	3.2	3.6	4.1	5.07
Bura High sch	6.7128	6.8	6.4	6.5	6.1	-
Kenyatta High	8.2997	7.5	7.5	8.1	8.0	-
Matuga Girls		6.3	6.8	7.2	7.88	6.4
Average mean	6.3654	5.3355	5.383	5.619	6.097	4.4953

Section B: Old national schools

Mangu High	10.8364	10.3	10.19	10.75	-	9.93
Starehe Boys	10.8391	10.7	10.46	10.63	10.59	-
Alliance high	11.1455	10.966	11.45	11.4	11.37	9.6
Alliance Girls	11.0822	10.89	10.204	10.19	10.07	10.18
Kenya High	10.6501	10.90	10.65	10.173	10.5	9.96
Maseno	10.1029	10.670	11.02	10.935	11.393	-
Nairobi School	10.2631	10.55	10.58	10.853	10.82	9.2
Mary hill	10.5011	10.63	10.6919	9.80	10.8244	9.44
Loreto Limuru	10.1129	10.81	10.30	10.0	-	9.47
Average mean	10.6148	10.7129	10.6162	10.5257	10.795	9.6829

Source: KNEC Data (2018).

In the year 2015, only 31.52% of the candidates attained minimum university entry requirement grade of a C+, while in 2016, only 15.41% attained a C+ and above. According to Mushtaq (2012), the academic performance of individuals has a direct effect on economic and social development. Making education accessible without paying attention to performance in national examination might not give the expected benefits.

There are several factors that influence academic performance. These include student textbook ratio, teacher student ratio, student class ratio, and climate and school tenor. Although all these factors influence academic performance, this paper is limited to infrastructure and staffing. Infrastructure in schools include classrooms, laboratories, halls, dormitories, sanitation facilities, games equipment and play fields. Mokaya (2013) notes that improved academic performance is as a result of adequate infrastructural facilities. Schneider (2002) notes that for schools to acquire these facilities, they require adequate financing for constructing and maintenance of the structures. Infrastructural facilities affect teaching by teachers and learning by students. Another research by Murillo & Román (2011) in Latin America revealed that academic achievement is affected by availability of infrastructural facilities. Akomolafe & Adesua (2016) conducted a study in West Nigeria and learnt that a relationship existed between physical facilities in schools and their academic performance. Stephen & Schaben (2002) report that many education institutions in East Africa have a common challenge of poor infrastructure. Infrastructure in many of the schools is old and dilapidated. They warned that enrolment in schools

is rising without putting into consideration infrastructural facilities.

Another factor important in academic performance is staffing. Teachers have a crucial role in the academic attainment of learners they teach. Teachers are the policy implementers. Hightower et al. (2011) note that the most influential factor in a learner's academic performance is a teacher. Teachers therefore, cannot be separated from the attainments by the learners. A high teacher student ratio weakens the quality of education being offered and also affects timely curriculum delivery. It also reduces learner attention, with consequences of poor academic performance. According to Education For All (EFA) global monitoring report, pupil teacher ratios in schools are too high (UNESCO, 2014).

This study was informed by the realization that despite the move by the government to increase the number of national schools, excellent performance is a big challenge in these schools. There is a big gap between performance in the old long established national schools and the young national schools. Data indicates that performance in the old national schools has been consistently high. The study was to determine the extent to which infrastructural facilities and staffing influence performance in the young national schools.

The study objectives were:

- To establish the influence of infrastructural facilities on academic performance in young national schools in Marsabit, Samburu, and Isiolo counties.

- To determine the influence of staffing on academic performance in young national schools in Marsabit, Samburu, and Isiolo counties.

The study hypothesized that:

- Infrastructural facilities have no statistically significant influence on academic performance in young national schools in Marsabit, Samburu, and Isiolo counties.
- Staffing has no statistically significant influence on academic performance in young national schools in Marsabit, Samburu, and Isiolo counties.

LITERATURE REVIEW

Infrastructure in schools affect the quality of education offered. Their physical measure comprises of the age, condition, and their comprehensiveness (Ullah et al., 2011). The elevation to national status should mean that more and better resources are available in those schools to enhance the quality of education being offered there. Research by Ozochukwe (2015) revealed that provision of quality education is the priority of each African nation. Nevertheless, there are a number of challenges hindering the achievement of education in the developing world. According to his finding, the factors that hinder academic attainment in Africa include poor funding by the government, unqualified teachers, and poor infrastructural facilities.

The findings from Ozochukwe study is supported by Lupton (2005) who stated that there is need for more funding as well as implementation of organization structure for quality education to be achieved in post primary levels in Africa. Another study by Fuller & Heyneman (1989) revealed that increasing enrolment followed by decreasing resources are lowering the quality of education being offered. According to Somasasa (2015), inadequate infrastructure in schools can be attributed to the current economic crisis. The authors address the constraint educational institutions face, hence were relevant to this study. However, they give a general overview to the problems. This means they may not have addressed constraints that arose in the young national schools

following their elevation to national status. It is very important to determine whether they acquired the required infrastructure to accommodate the rising numbers in those schools, and whether constraints related to infrastructure could influence performance in the national exams.

In research in schools in the U.S, Schneider found out that facilities in school affect teaching by teachers and learning by students, and hence the final output of education. Schools therefore, need enough financing not only for construction but also for maintenance of infrastructure (Schneider, 2002). This necessitated research to find out whether the facilities are available in the young national schools. Facilities such as libraries, science laboratories, and computer labs have an effect on educational attainment. Gretes (2013) notes that libraries are crucial in development of student skills. When they are present, they contribute to better scores by learners. In case of a financial challenge where a choice has to be made, libraries are sacrificed first. Research reveals that schools that depend on libraries to support growth and education of learners in information, literacy, and access to resources have higher scores by the learners in tests, have more graduations, and motivation in those institutions is higher (Small et al., 2010). The authors further state that the outcome of better library service in schools is better learning by learners hence higher performance. Those findings are based in the U.S hence a need to fill the geographical gap. This research study sought to examine the presence of such facilities in the young national schools and whether they are functional and well equipped. Additionally, when these schools received the national status, they were allocated 25 million each for structures and facilities improvement. No research has been conducted since then to find out whether those schools acquired the necessary infrastructure to offer quality education. This created a need for this research to assess the situation in those schools and the influence of these facilities on academic performance.

The staffing measure focuses on the number of teachers in the young national schools relative to the number of learners. It also looks at the academic qualification of the teaching staff (Ullah et al., 2011). EFA Global Monitoring Report (2010) states

that the outcome of a high teacher student ratio is weak quality education in the schools. Countries try to resolve the challenge of high teacher student ratio by hiring untrained teachers which in turn compromise the quality of education. In addition to this, lack of individual attention due to high teacher student ratio means that academically challenged learners are left behind (Nkinyangi, 2003; Katunzi & Ndalichako, 2004). UNESCO (2014) noted that teacher student ratios in schools were too high and students were squeezed in congested classrooms. According to Ministry of Education (2013) students outnumber teachers and hence they cannot teach effectively, particularly in classes that are overcrowded. This necessitated research to establish whether there is a shortage of teachers and the influence of staffing on performance in the national examinations.

Similarly, Jambonewspot (2015) also noted that there is a deep and acute teacher shortage which leads to a high teacher student ratio. This report was on secondary schools in general and hence necessitated research to establish whether this is the scenario in the young national schools. Njeru et al. (2014) note that the government hires few teachers and, in most cases, it only replaces those who have exited due to natural attrition. The high teacher pupil ratio crisis is therefore unending. Their study however focused mainly on free primary education. This study gave special attention to the young national schools.

The low mean scores from the young national schools could be emanating from constraints in staffing in those schools. It is expected that the elevation from their previous state of provincial schools to national schools had an impact on staffing, and hence there could be no corresponding change in academic achievement. This is what the study aimed at establishing.

METHODOLOGY

Correlation research design was used to achieve the study objectives. The study was carried out in

Samburu, Marsabit, and Isiolo counties. These counties are located in arid areas in the country. 5 principals from the young national schools, 150 teachers, 3 County staffing officers, and 3 sub county examinations officers comprised the study population. The three selected counties have five young national schools which were all purposively selected. Teacher's sample size was obtained proportionately and 60 out of the 150 teachers in those schools were selected. This was in agreement with Mugenda & Mugenda (2003) that the adequate sample size for a study is 30% of the target population. Examination officers and staffing officers were purposively selected. Consequently, a sample size of 60 teachers, 5 principals, 3 examinations officers and 3 staffing officers was used. The total sample was therefore 71.

Data was collected using questionnaires, interview guides, and observation schedules. Piloting was done, and the test-retest method was used to determine instrument reliability using Pearson product moment. The reliability coefficient was above 0.7 and hence they were considered reliable for the study. Analysis of data was through descriptive and inferential statistics, which entailed use of multiple regression analysis and correlation analysis.

RESULTS

Findings and discussions of the study based on the study objectives guiding the study are presented in this section. To establish the influence of infrastructural facilities and staffing on academic performance in the national schools in Samburu, Marsabit, and Isiolo counties, information was collected on the class population, adequacy of infrastructural facilities and the teacher student ratio in the schools. The premises formulated were tested in form of hypothesis to achieve the study objectives.

The respondents were asked to rate the spacing in the classes in the selected schools. The results are shown in *Table 2*.

Table 2: Respondents view on whether the classes were spacious or congested

County	Class Size	Frequency	Percent
Isiolo	Congested	9	90.0
	Spacious	1	10.0
	Total	10	100.0
Samburu	Congested	21	77.8
	Spacious	6	22.2
	Total	27	100.0
Marsabit	Congested	15	83.3
	Spacious	3	16.7
	Total	18	100.0

Source: (Survey Data, 2019)

From the table, majority of the respondents from all the counties noted that the classes are congested.

The respondents were asked whether the schools had enough infrastructural facilities. The analysis of the results is shown in *Table 3*.

Table 3: Respondents view on whether school had adequate infrastructural facilities

Infrastructural facilities	Isiolo				Samburu				Marsabit			
	Yes		No		Yes		No		Yes		No	
	f	%	f	%	f	%	f	%	f	%	f	%
Adequate infrastructural facilities	2	20.0	8	80.0	2	7.4	25	92.6	1	5.6	17	94.4
Equipped library	2	20.0	8	80.0	12	44.4	15	55.6	4	22.2	14	77.8
Functional internet connected ICT research Centre	1	10.0	9	90.0	3	11.1	24	88.9	0	0.0	18	100.0
Equipped Science Laboratories	0	0.0	10	100.0	4	14.8	23	85.2	1	5.6	17	94.4

Source: (Survey Data, 2019)

Table 3 shows that, according to majority of the respondents, 50 (90.9%), infrastructural facilities were not enough.

The researcher further sought to find the teacher student ratio with the aim of identifying whether the school was understaffed. The results are shown in table below

Table 4: The teacher student ratio in the schools

County		Frequency	Percent
Isiolo	1:10-1:30	2	20.0
	1:31-1:50	5	50.0
	1:51-1:70	3	30.0
	Total	10	100.0
Samburu	1:31-1:50	9	33.3
	1:51-1:70	18	66.7
	Total	27	100.0
Marsabit	1:31-1:50	5	27.8
	1:51-1:70	13	72.2
	Total	18	100.0

Source: (Survey Data, 2019)

From the results, majority of the schools had a higher teacher student ratio than the one recommended by the government of Kenya of 42:1 and the international ceiling of 40:1. With more than half of the schools being understaffed, the teaching staff is overstretched making it difficult to pay attention to the individual needs of the learners.

The study sought to establish the influence of infrastructural facilities on academic performance in young national schools in Marsabit, Samburu and Isiolo counties. The results are shown in *Table 5*.

Table 5: The influence of infrastructural facilities on academic performance in young national schools in Marsabit, Samburu and Isiolo Counties

		Performance	Infrastructure
Performance	Pearson Correlation	1	.495**
	P-value		.000
	N	55	55
Infrastructure	Pearson Correlation	.495**	1
	P-value	.000	
	N	55	55

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

The table above points that correlation coefficient is positive suggesting that infrastructural facilities are positively correlated with performance.

The findings indicated a statistically significant positive correlation between infrastructure and academic performance ($r=0.495$, $p\text{-value}=0.000$). Therefore, the study rejects the null hypothesis ‘*there is no statistically significance influence of infrastructural facilities on academic performance in the Young National Schools in Samburu, Marsabit, and Isiolo counties.*’ Consequently, the alternate hypothesis ‘*there is statistically significant influence of infrastructural facilities on academic performance in the Young National Schools in*

Samburu, Marsabit, and Isiolo counties’ is accepted.

The study findings are in agreement with the findings by Ozochukwe (2015) that inadequate government funding and poor infrastructure are some of the hindrances of educational attainment in Africa. The study findings also support the findings by Lupton (2005) that schools need more funding.

The study also sought to establish the influence of staffing on academic performance in young national schools in Marsabit, Samburu, and Isiolo counties. The results are shown in *Table 6*.

Table 6: The influence of staffing on academic performance in young national schools in Marsabit, Samburu and Isiolo Counties

		Performance	Staffing
Performance	Pearson Correlation	1	.372**
	P-value		.005
	N	55	55
Staffing	Pearson Correlation	.372**	1
	P-value	.005	
	N	55	55

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

The findings indicated a significant positive correlation between staffing and academic performance ($r=0.372$, $p\text{-value}=0.05$). Therefore,

the study rejects the hypothesis, ‘*there is no statistically significant influence of staffing on academic performance in Young National Schools*

in Samburu, Marsabit and Isiolo counties.’ Consequently, the alternate hypothesis, ‘there is statistically significant influence of staffing on academic performance in Young National Schools in Samburu, Marsabit, and Isiolo counties’ is accepted.

The study findings are in agreement with the research by Monks & Schmidt (2010) that the

number of students handled by a teacher in a class affects the outcomes by the learners. The student performance could therefore be improved by reducing the class size.

A regression analysis was done to find out the extent to which independent variables determine academic performance. The results are shown in *Table 7*.

Table 7: Regression model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.561 ^a	.315	.288	.58204

a. Predictors: (Constant), Staffing, infrastructure

b. Dependent variable: Performance

Table 7 indicates that 31.5% of the variation in academic performance can be explained by staffing

and infrastructural facilities. The Analysis of Variance is shown in *table 7* below.

Table 8: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.093	2	4.047	11.945	.000 ^b
	Residual	17.616	52	.339		
	Total	25.709	54			

Dependent Variable: Academic Performance

Predictors: (Constant), Staffing, Infrastructure

The F-test was used to measure the overall model. From *Table 8*, the F-statistic at 2 and 52 degrees of freedom is 11.945. Since its associated p-value is approximately 0.0001 which is less than 0.05, the overall model was found to be statistically

significant at 5% level of significance. A regression analysis was done to determine the impact of infrastructural facilities on academic performance. The results are shown in *Table 8*.

Table 9: Regression Coefficients

Coefficients ^a		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics
Model		B	Std. Error	Beta			Tolerance
1	(Constant)	1.308	.369		3.545	.001	
	Infrastructure	2.008	.549	.431	3.656	.001	.946
	Staffing	.331	.144	.272	2.307	.025	.946

Table 9 shows that the coefficient of infrastructure was 2.008. This means that infrastructure has a positive significant impact on performance. The coefficient for staffing was .331. Staffing also has a positive significant impact on performance. Infrastructure had a bigger impact compared to staffing.

DISCUSSION

This study sought to establish the influence of infrastructural facilities and staffing on Students’ Performance in National Examinations in Young

National Schools in Samburu, Marsabit, and Isiolo Counties, Kenya.

With regard to infrastructural facilities influence on academic performance, the study reveals a positive and statistically significant relationship. It was noted that the schools lacked adequate infrastructural facilities to enhance academic performance. Despite the schools having libraries, they were not equipped well. Important reference books as well as other facilities were missing. Science laboratories were not enough to accommodate the school population. The laboratories lacked crucial apparatus. The classes were found to be congested. Furthermore, the poor performance in national exams can be envisaged by inadequate infrastructural facilities. These findings concur with the findings by Schneider (2002) that, good learning facilities in the schools impact outcomes by learners.

Despite the crucial role played by extracurricular activities in supporting learning, the schools do not have enough play fields, with some accommodating only one or two games. The available fields were not well developed. The schools also lacked internet connection at ICT research centres. It was noted that the only internet connected computer was used by the school secretary.

Regression analysis indicated that increase in infrastructural facilities increases academic performance in the school. Correlation analysis gave a positive relationship between infrastructural facilities and academic performance. These findings relate to a study in Nigeria by Fagbohunka (2017) which established that the infrastructural facilities hugely affect academic performance. Developing infrastructural facilities should therefore be given urgent attention to overcome this ugly scenario in the Kenya secondary education.

The study further revealed that staffing influenced academic performance in the young national schools in Samburu, Marsabit, and Isiolo counties. Majority of the schools were understaffed leading to overworking of the available teaching force. Some subjects such as Mathematics and Physics had acute teacher shortage.

Respondents affirmed that student performance was linked to teacher student ratio. Teacher student ratio

affects timely syllabus coverage and individual attention from the teacher. The result is that academically challenged learners are left behind leading to poor exam results (Nkinyangi, 2003; Katunzi & Ndalichako, 2004). When a teacher has too many learners, he/she is unable to give individual learners individual attention especially the weak learners. The study findings are similar to the findings by Monks & Schmidt (2010) in their research that the total learners handled by a teacher affect the outcomes by the student.

Regression analysis further revealed that increase in the number of staff leads to increase in academic performance. Similarly, correlation analysis gave a positive relationship between staffing and academic performance. This study finding is in agreement with Akinsolu (2010) that staffing affects academic performance in a great way. Similar findings were obtained by Luketero & Kangangi (2019) that high teacher-student ratio leads to poor academic performance.

CONCLUSION

The schools were understaffed and teachers have high workloads. Schools lacked enough infrastructural facilities and had congested classes. They lacked enough play fields and internet connected ICT research centres. The schools also have high teacher student ratio.

All Pearson correlations were positive implying that a positive relationship existed between infrastructural facilities, instructional materials, enrolment and staffing, and academic performance. Results from multiple regression indicated that staffing, enrolment, infrastructural facilities and instructional materials had a positive significant impact on performance.

Academic performance in the young national schools is influenced by staffing, infrastructural facilities, instructional materials, and enrolment. Governments should post more teachers to those schools and increase funding to improve infrastructure in those institutions. The schools should enrol students with better entry behaviour similar to other national schools.

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