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RESEARCH ARTICLE

INFLUENCE OF PHYSICAL FACILITIES ON QUALITY OF SECONDARY SCHOOL EDUCATION IN KENYA: A CASE STUDY OF MIGORI COUNTY

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ABSTRACT

Studies worldwide have revealed that physical facilities in schools invariably enhance quality education. In Kenya a lot of emphasis has been put on provision of physical facilities mainly by parents to enhance the quality of education offered. Nevertheless, performance by students in these schools has been generally low. Migori County is one of the counties that has been noted to be performing poorly in national examinations particularly at secondary school level. The performance in Migori County between 2011 and 2017 was generally low, thus Migori County was chosen among 5 counties surveyed because it had the lowest average mean score of 4.530 (D+) and between 2011 and 2017 it varied from C- in 2011 to D in 2017 exhibiting poor quality education. The average national Kenya Certificate of Secondary Education mean score from 2011 to 2017 varied from 5.207 (C-) 2011 5.173 (C-) in 2012 and declined to mean score of D+ between 2013 to 2015. The national Kenya Certificate of Secondary Education mean score dropped to a mean score of 3.980 (D) in 2016 and declined to 3.734 in 2017 resulting in an average national mean score of 4.617 (D+) over a seven year period which indicates declining quality education. The objective of this study was therefore to examine the influence of physical facilities on quality of secondary school education in Migori County, Kenya. The study established that physical facilities accounted for 34.9% of students' academic performance as signified by the Adjusted R square coefficient 0.349. The physical facilities included; dormitories, classrooms, furniture, water supply, electricity supply, dining halls, toilets, playgrounds, staff houses, administration offices, departmental offices and the health bay. Students' performance in national examinations is considered an ultimate indicator of the quality of education. This therefore means that physical facilities significantly influenced the quality of secondary school education in Kenya.

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INTRODUCTION

Provision of quality education is a key ingredient in achieving Kenya's Vision 2030 and making her a middle income country by the year 2050. Republic of Kenya (2014) describes quality education as adequately and equitably resourcing education institutions and programmes with core requirements of safe, environmentally, friendly and easily accessible facilities, motivated and professionally competent teachers and books, other learning materials and technologies that are content specific, cost effective and available to all learners. The challenge is that quality must be continuously sustained at a specified standard through adequate resourcing. Orodho (2002) complements discussion on quality of education as comprising the development of a student's potential measured by indicators of quality, comprising availability, adequacy and state of inputs namely teaching force in terms of student/teacher ratio, physical facilities, instructional materials as well as the curriculum and hours taught and also addresses indicators like performance in the Kenya Certificate of Primary Education and Kenya Certificate of Secondary Education; transition rates from primary and secondary schools and the overall survival rate from primary standard one level upto the university. Quality of secondary school education refers to the desired knowledge and skills acquired at secondary school education as measured by students academic achievement or performance. Quality secondary school education is measured by attaining high standards as a mean score of C+ and above in Kenya Certificate of Secondary Education. Quality also refers to the availability, adequacy and state of inputs and requires continuous improvement. Investments in secondary school education can be justified on

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grounds of provision of knowledge and skills that build the human resource to contribute social, cultural and economic development. Investment in the secondary education subsector improves human capital which results in greater returns to the individual and the society (Psacharopolous & Patrinos, 2002). Investments in the secondary sub-sector fans access which if not matched by additional resourcing results in deterioration in quality of secondary school education. The World Bank (2005) supports the human capital development perspective as it observes that it brings about benefits on democracy, better citizenship, crime reduction and improvement of living conditions. Human capital development improves productivity, enhances competences, stimulates economic development, raises standards of living, reduces poverty and uplifts quality of secondary education. In a nutshell physical facilities refers to resources that enable learning to take place. They comprise land, dormitories, classrooms, furniture, playgrounds, dining hall, health bay, toilets, water and electricity. Physical facilities was chosen as an institutional input because most studies on influence of physical facilities on school attainment have limited themselves to a few limited physical facilities. Studies by Lee, Zuze and Rose (2005), Lee and Zuze (2011) and Akinyi, Nyanzia and Orodho (2015) on influence of physical facilities on school performance chose only a few physical facilities like buildings, water and electricity.

Physical facilities refers to the entire tangible infrastructure in secondary schools comprising land, buildings, furniture, electricity and water. In a study by Nandamuri (2012) in India on the status of secondary education in Andhra, physical facilities had an influence of 0.026 on the quality of education at the 0.05 level of significance. This shows there is a weak relationship between physical facilities and performance of secondary schools. This finding is inconsistent with other outcomes where physical facilities have an impact on performance. The Nandamuri's study established that in an overall school infrastructure based on eight vital parameters, only 60% of the schools operate with spacious premises and 68% felt the furniture was inadequate and only 41% had spacious playgrounds and gender specific toilet facilities had a need of 25% in the government schools and 34% in the local boarding schools. It established that 44% of the schools had insufficient accommodation as the buildings were fewer. However all the government and private aided and private unaided schools have sufficient furniture available for both students and staff. These challenges make India to lag behind in the provision of quality secondary education. The study used a descriptive survey which was appropriate in determining the status of existing physical facilities. The study used a sample of 188 secondary schools out of the population of 557 secondary schools in Krishna district of Ardhra Pradesh in India which was selected through stratified sampling to take care of the various clusters in the population. The primary responses were collected through a structured questionnaire administered to the respective school heads. The use of only one instrument to collect information may compromise the validity and reliability of the results. The data was analysed using chi-square and simple descriptive statistics to determine the influence of physical facilities on performance. The strength of the study lay in the fact that the study used an appropriate sampling technique and an in-depth data analysis. The reviewed study did not investigate the influence of institutional inputs on the quality of secondary school education which the study in Migori County did.

However another study by Rogers, Suryadarma, Sunyahadi and Sumanto (2005) in Indonesia on improving student performance in public primary schools showed that the relationship between physical facilities in form of toilets and performance in primary schools was a coefficient of correlation of 0.324 for boys and 0.310 for girls which depicted a weak relationship. The study was a survey of 8 Provinces out of 10 in Indonesia. The sample in the study comprised 110 public schools which yielded a sample of 1,089 students. The instruments of data collection were the questionnaire and the interview schedule to collect data from the students. Quantitative data analysis using regression was used to analyze influence between physical facilities and performance. The strength lay in the use of a variety of instruments. The study however did not specifically tackle the influence of institutional inputs of entry behaviour, teaching /learning resources, teacher characteristics and IGAs on the quality of secondary school education as it focused on primary school education. Lee, Zuze and Ross (2005) on school effectiveness in 14 sub-Saharan African countries reported that the availability of physical resources like electricity, water, library, buildings and equipment improved the achievement levels of the students and the schools and the quality of education in all the countries. The 14 countries had different historical, social and economic set-ups but in all cases where physical infrastructure were available it made a change to attainment levels. Lee, Zuze and Ross (2005) used a correlational design which focused on school effects. The sample in the study was 41686 students in 2305 schools spread in 14 countries. The instrument of data collection was the questionnaire for students to establish the relationship between physical facilities and performance. Quantitative data analysis using regression analysis was used. However the study in ignoring the use of longitudinal studies cannot provide a reliable trend perspective over the impact of physical resources.

Chavundika (2006) in Zimbambwe where students could be 10 in a class did not necessarily result in superior performance. This means low class size of less than 40 students does not necessarily guarantee better teaching but in Africa with limited resources it results in ineffective use of existing capacities especially when classes are overcrowded due to poor mobilization of physical resources. Quality of education is affected. The World Bank (2008) on physical resources in sub Saharan countries found out disparities in physical facilities such as of classrooms, toilets, laboratories in the region with dramatic inadequacies in rural areas and concluded that lack of basic physical structures hinders teaching and implementation efforts and impedes achievement of quality secondary education. Yeya (2002) on performance in Kenya Certificate of Secondary Education examinations in Kwale District reinforces the findings that schools with adequate facilities perform better in national examinations especially in mathematics. Competent teachers and adequate textbooks improve optimum utilization of physical resources. The study on influence of institutional inputs in Migori County not only tackled the effects of physical facilities but also other inputs like entry behaviour, physical facilities, teaching/learning resources, teacher characteristics, income generating activities and focused on quality of secondary school education. Molochi (2008) on Kuria West on a survey on education established lack of desks and libraries. Koech (2013) in Kuria East on head teachers strategies in curbing dropout in public primary schools

established that 47.7% of the parents did not buy supplementary learning materials for the pupils. The study on institutional inputs in Migori County not only tackled physical and learning resources but also inputs of entry behaviour, teacher characteristics and income generating activities and focused on quality of secondary school education. The World Bank (2005) observes that in Denmark and Spain a third of the students and in Canada and Greece, Iceland, New Zealand and Poland over a quarter appear to miss school or skip classes regularly and in Japan and Korea by contrast the low attendance category account for lower than 1 in 10. Regular attendance of classes such as in Japan and Korea results in higher quality education while poor class attendance like in Denmark, Spain, Poland and Canada undermines the quality of secondary school education because regular attendance of students have more learning time and irregular attendance have less time for learning. World Bank (2005) and UNESCO (2005) on developed countries reveal disparities between intended instruction time in the curriculum, actual time allocated in schools, the time the learner spends learning (time on task) and the time they spent in situations when students and learning material are matched and learning occurs in a conducive environment. The amount of time decreases from the first to the fourth of these categories especially schools in poor communities. The implication is that time management influences quality of secondary school education with effective time management enhancing quality of education and ineffective time management undermining quality of education.

Research Objective: The research objective was: To examine the influence of physical facilities on quality of secondary school education.

Synthesis of literature on influence of physical facilities on quality of secondary school education: Physical facilities refers to the entire tangible infrastructure in secondary schools comprising of land, buildings, furniture, electric plant and water installation or plant. In a study by Nandamuri (2012) in India on the status of secondary education in Andhra it was established that physical facilities had an influence of 0.026 on the quality of education at the 0.05 level of significance. This shows there is a weak relationship between physical facilities and performance of secondary schools. The study showed that an overall school infrastructure based on eight vital parameters only 60% of the schools operated with spacious premises and 68% felt the furniture was inadequate and only 41% had spacious playgrounds and gender specific toilet facilities had a need of 25% in the government schools and 34% in the local boarding schools. The study also established that 44% of the schools had insufficient accommodation as the buildings were fewer but all the government private aided and private unaided had sufficient furniture available for both students and staff. These challenges make India to lag behind in the provision of quality secondary school education. The study used a descriptive survey which was appropriate in determining the status of existing physical facilities. The study used a sample of 188 secondary schools out of the population of 557 secondary schools in Krishna district of Ardhra Pradesh in India which was selected through stratified sampling to take care of the various clusters in the population. The primary responses were collected through a structured questionnaire administered to the respective school heads. The use of only one instrument to collect information may compromise the validity and reliability of the results. The data was analysed using chi-square and simple descriptive statistics. The strength of the study lay in the fact that the study used an appropriate sampling technique and an in-depth data analysis. The reviewed study did not investigate the influence of institutional inputs on quality of secondary school education. The study on institutional inputs on quality of secondary education in Migori County explained the contribution of each physical facilities like dormitories, toilets, water, electricity, classrooms and furniture to quality secondary education. However another study by Rogers, Suryadama, Sunyahadi and Sumanto (2005) in Indonesia on improving student performance in public primary schools in developing countries showed that the relationship between physical facilities in form of toilets and performance in primary schools was a coefficient of correlation of 0.324 for boys and 0.310 for girls which depicts a weak relationship. The study was a survey of 8 provinces out of 10 in Indonesia. The sample in the study comprised 110 public schools which yielded a sample of 1089 students, the questionnaire and the interview schedule. Quantitative data analysis using regression was used. The studies strength lay in the use a variety of instruments and on reliable and sensitive multivariate analysis to determine this relationship between physical facilities and student performance. The study however did not specifically tackle the influence of institutional inputs on the quality of secondary school education as it focused on primary school education. In a comparative study on student's academic achievement comprising India, Russia, China, Brazil, Mexico, South Africa and Indonesia; India scored minimum points (second last position) in primary, secondary, tertiary and demographic parameters because of poor framework for planning in school management, academic infrastructure, community participation and financial aspects while Russia, and Brazil had maximum points (AssoCHAM, 2008). The methodology used in the study was robust enough to include many variables but the statistical tools used for comparing the quality of the physical facilities were not specific.

In industrialized countries variation in basic school facilities are only weakly linked to student achievement as basic resources are typically available even in what are considered poor communities (Lee & Zuze, 2011). The high quality of the facilities and the relatively efficient management of student numbers reduces the recurrent and development costs of the facilities. The reviewed studies dealt with the existence of physical facilities in secondary school education but did not deal with the adequacy and the utilization of physical facilities on quality secondary education. In a research by Lee, Zuze and Ross (2005) on school effectiveness in 14 sub-Saharan African countries it was found out that the availability of physical resources like electricity, water, library, buildings and equipment improved the achievement levels of the students and the schools and the quality of education in all the countries investigated. The 14 countries had different historical, social and economic set-ups but all cases where physical facilities was available it made changes to attainment levels. The study used a correlational design which focused on school effects. The sample in the study was 41686 students in 2305 schools spread in 14 countries. The instrument of data collection was the questionnaire. Quantitative data analysis using multivariate data analysis was used. The studies strength lay in the use of large database. However the study in ignoring the use of longitudinal studies cannot provide a reliable trend perspective over the impact of physical resources. Moreover the study only tackled availability of physical resources but not the adequacy

and utilization of these physical facilities. The study on influence of institutional inputs in Migori County explored many physical facilities comprising dormitories, classrooms, furniture, water, electricity, dining hall, playground and health bay unlike the Lee, Zuze and Ross study. The study in Migori on institutional inputs also explored the contribution of each physical facility on the quality secondary education. Chavundika (2006) in Zimbabwe established that class size for some subjects like physics students were 10 but this did not necessarily result in superior performance which means low class size does not necessarily guarantee better teaching. The schools make ineffective use of existing capacities where classes are overcrowded due to poor mobilization of physical facilities. Performance deteriorates and the quality of education declines.

The World Bank (2008) articulates that the scarcity of buildings has resulted in overcrowded classrooms is the reality for many schools in sub Saharan Africa and there is a close relation between instructional quality, class size and teacher capacity as those teaching 40 or more students have a demanding task even for the best teacher and although reduction in class size do not per se guarantee better instruction but manageable class size are strong factors for improvement of instructional quality. The World Bank study did not investigate influence of institutional inputs that affect the quality of secondary education since it focused on classrooms. The study on influence of institutional inputs was robust as it tackled a wide parameter of physical facilities. The Migori study also compared the contribution of physical facilities to the other institutional inputs of entry behaviour, teaching /learning resources, teacher characteristics and Income Generating Activities. In a study by Sifuna and Kaime (2007) on the effect of In-Service Education And Training programmes in mathematics and science on classroom interaction in primary and secondary schools in Kenya it was found out that challenges in the teaching of mathematics and science was due to lack of adequate spacious classrooms, lack of teaching facilities and equipment among other factors. The results of the research were that 56.2% of SMASSE respondents identified large overcrowded classes as a reason for poor performance and 54.4% of respondents identified lack of teaching facilities as a reason for poor performance and 54.8% of the respondents identified lack of equipment as being a challenge.

The above study did not investigate the influence of physical facilities on the quality of secondary school education but confined itself to the impact of classroom and equipment in the teaching of mathematics and science. The study design was a purposive case study survey. The study used a sample of 4 districts; Kiambu, Nairobi, Kajiado and Garissa; 14 primary schools and 22 secondary schools and 2 Mathematics and 2 Science teachers. The instruments used in data collection were interview schedule, focus group discussion and classroom discussion. Largely qualitative and some quantitative data analysis was used. The strength of the study was that a variety of the instruments were used which generated a wide range of data. The research adopted a case study survey which enabled a more in-depth and systematic evaluation of the study. The limitation of the study was the use of purposive sample for a SMASSE program that has a national focus. The reviewed study did not deal with influence of physical facilities factors on the quality of secondary school education. The study did not deal with adequacy and effective use of physical facilities.

In a study carried out in Kenya by Mwiria (2002) on vocationalization of secondary education in Kenya it was established that the cost of setting up physical facilities in secondary schools like workshops of home science, agriculture, woodwork, building and construction, power mechanics, electrical and computer laboratories and maintenance costs were higher than those of setting up and maintaining science laboratories of chemistry, biology and physics. Some of the vocational subjects are now offered in technical secondary schools where financial allocation by the government is higher. The study used a case study design which enabled a thorough analysis of the issue. The population sample that was used was 70 which was adequate at the time of the study. The instruments of data collection was an interview schedule which was not supported by other instruments. Data analysis used only descriptive statistics but not inferential statistics which did not enable measurement of the magnitude of the variables. The research reviewed did not deal with impact of physical resources on quality of secondary school education and in particular it did not tackle the adequacy and utilization of physical facilities.

In a study in Kuria East and Kuria West by Molochi (2008) on the state of education carried out both in primary and secondary schools it was found out that there were lack of physical facilities and the ones that existed were overstretched and in very poor state and ineffectively used. Some primary school in Masaba division had 536 pupils but only 8 classrooms whose carrying capacity should be 40 pupils per class. Desks were inadequate in primary schools as 4 pupils shared a desk. Most affected were secondary schools that lacked basic facilities such as libraries, laboratories computer laboratories and toilets. The above study concluded that lack of physical facilities affected the learning outcomes. Chacha and Zani (2015) in a study on the impact of Free Primary Education on pupil teacher ratio in Kuria East constituency although conducted for the primary sector is relevant for secondary school education as it dealt with facilities. The study established that there was lack of classrooms which led to overcrowding and a pupil-teacher ratio of 60:1 thus lowering the student's academic achievement. Usually overcrowding in classrooms makes the students to develop fever, headaches, tiredness, to be inattentive and sleepy in class due to limited access to air. This poor learning environment lowers performance and results in declining quality of education. The teachers could not carry out their work effectively. This study sampled 68 schools, 68 head teachers and 637 teachers. The research design was a mixed method approach. Only questionnaires were used as an instrument of data collection which limited data capture. Quantitative data analysis was fair which enabled determining the magnitude of the relationship among variables. The studies strength lay in the use of a large sample which enhanced reliability. The reviewed studies did not capture physical facilities as an institutional input that influences quality of secondary school education. In a study by Akinyi, Nyanzia and Orodho (2015) on challenges facing implementation of inclusive education in public secondary schools in Rongo sub county, Migori County, it was found out that physical and critical teaching and learning resources were either inadequate or quite dilapidated and there were several economic and cultural variables that constrained teaching and learning. The study used a descriptive survey design. The use of descriptive statistics comprising means and percentages did not give the magnitude nor the direction of the relationship between independents and dependent variables.

The study sample comprised 34 secondary schools, 34 principals, 170 students with special needs, 102 teachers and the sub county quality assurance and standards officer. The sample used questionnaires to collect information from students, and teachers and interview schedule for school principals and quality. The study used an observation checklist. The use of a wide range of instruments enabled the capture and corroboration of a variety of information. The study focused on challenges facing implementation of an inclusive education in public secondary schools but did not deal with institutional inputs that influence the quality of secondary school education.

Theoretical Framework: The study on the influence of physical facilities on quality of secondary school education was informed by the Production Function Model. The model postulates that educational outcomes are a function of factors such as teacher pupil ratio, instructional materials among others (Psacharopoulos & Woodhall, 1985). The formula of production function model is;

A = f (A, T, B, E.....) (1)

Where;

A -is Achievement / quality of secondary school education
T- is Teacher pupil ratio
B -is books and other materials
E- is Equipment

In this study the education production function model was expressed as A = f (E, F, G, H, I,.....) (I)

Where;

E = Dormitories
F = Classrooms
G = Furniture
H = Staff Houses
I = Department offices
J = Admin offices
K = Water supply
L = Electricity supply
M= Dining hall
N = Toilets
O = Play ground
P = Health bay

When quality of secondary school education was taken as dependent variable (A) and dormitories, classrooms, Furniture, staff houses, department offices administration offices, water supply, electricity supply, dining hall, toilets, health bay and play ground as independent variables.

$$A = f(X_{1,} X_{2,} X_{3,} \ldots\ldots\ldots\ldots\ldots\ldots X_n) \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

The Education Production Function Model was re-constructed as a regression model thus;

Y=Bo+B1X1..... (3)

In which case Y was the dependent variable and represented by Kenya Certificate of Secondary Education examinations scores.

B_0 is the constant or intercept.

B_1 is the slope or change in 'Y' given one unit change in X_1.
X_1 = Dormitories
X_2 = Classroom
X_3 = Furniture
X_4 = Water
X_5 = Electricity
X_6 = Dining hall
X_7 = Toilets
X_8 = Playground
X_9 = Staff houses
X_{10} = Administration offices
X_{11} = Departmental offices
X_{12} = health bay

This model helped the study to focus on the variables of the study and computation of the data that was obtained in order to determine the influence of physical facilities on quality of secondary school education.

RESEARCH METHODOLOGY

This study is anchored on Psacharopolous production function model in education which relates inputs in education like learning resources to outputs in form of achievement measured by student performances. The study adopted descriptive and correlational research designs. The study population was 59,691 comprising of 245 principals, 2,439 teachers, 57,000 students and 7 Quality Assurance and Standards Officers. Fisher's formula was used to select 384 students, 331 teachers and 148 principals. Saturated sampling was used to select 7 Quality Assurance and Standards Officers resulting in total respondents of 870. The data was collected using questionnaires, interview schedule, observation guide, focus group discussion and document analysis guide. Face and content validity of the instruments were ascertained by experts in Educational administration who evaluated the appropriateness of items in the instruments. Their input was therefore included in the final instruments. Reliability of the instruments was ascertained by piloting in 7 schools whereby a coefficients of 0.8, 0.73, 0.78 for principals, teachers and students questionnaires were obtained and were above 0.7 at a set p-value of 0.05 and was therefore considered reliable. Inferential statistics were used to determine the influence of physical facilities on the quality of secondary school education. In effect the mean scores were regressed against physical facilities to establish the magnitude of the influence at the 0.05 level of significance.

RESULTS

Research Objective: The research objective was to determine the influence of physical facilities on quality of secondary school education. To achieve this objective a null hypothesis "Physical facilities do not significantly influence the quality of secondary school education." was generated. In order to rate physical facilities, money values were attached to the facilities to establish the extent to which they would influence quality of learning in secondary schools as measured by Kenya Certificate of Secondary Education mean scores. It should be noted that the money values were rated on a five point rating scale as Very Low, Low, Moderate, High and Very high.

Table 1. School Principals-rating Physical Facilities

		Very low	Low	Moderate	High	Very high	Total
Physical facilities		Ksh. 0.1 to 0.4 Million	Ksh. 0.5 to 0.9 Million	Ksh. 1.0 to 1.4 Million	Ksh. 1.5 to 1.9 Million	>Ksh. 2 Million	
Dormitories	F	36	35	24	10	5	110
	%	24.3	23.6	16.2	6.8	3.4	74.3
Classrooms	F	36	60	10	42	0	148
	%	24.3	40.5	6.8	28.4	0	100
Furniture	F	79	33	34	0	0	148
	%	54.7	22.3	23	0	0	100
Staff Houses	F	39	36	15	10	0	100
	%	26.4	24.3	10.1	6.8	0	67.6
Dept. offices	F	32	34	21	18	0	105
	%	21.6	23	14.2	12.2	0	71
Admin. offices	F	56	39	34	10	9	148
	%	37.8	26.4	23	6.8	6.1	100
Water supply	F	72	54	22	0	0	72
	%	48.6	36.5	14.9	0	0	100
Electricity supply	F	63	54	22	9	0	148
	%	42.6	36.5	14.9	6.1	0	100
Dining hall	F	18	39	23	53	15	148
	%	12.2	26.4	15.5	35.8	10.1	100
Toilets	F	55	64	29	0	0	148
	%	37.2	43.2	19.6	0	0	100
Play ground	F	38	52	50	0	0	148
	%	25.7	35.1	33.8	0	0	100
Health bay	F	20	19	18	0	0	57
	%	13.5	12.8	12.2	0	0	38.5

Table 2.Regression Analysis of Physical Facilities and Quality of Secondary School Education

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.606[a]	.367	.349	.397	.367	49.571	18	129	.000

a. Predictors: (Constant), playground, electricity, administration offices, water, dining hall, classroom, furniture, health bay, toilets, staff houses, departmental offices

Table 3. Analysis of Variance of Physical Facilities and Quality of Secondary Education

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	78.734	18	4.374	49.571	.000[a]
	Residual	8.030	129	.088		
	Total	86.764	147			

a.Predictors: (Constant), playground, electricity, administration offices, water, dining hall, classroom, furniture, health bay, dormitories, toilets, staff houses, departmental offices

b.Dependent Variable: Quality of secondary education

Table 4. Multiple Linear Regression Analysis of Influence of Physical Facilities on Quality of secondary School Education

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.602	.210		7.620	.000
	Dormitories	.292	.076	.441	6.438	.000
	Classroom	.227	.119	.591	2.749	.007
	Furniture	.176	.091	.310	17.242	.000
	Water	.172	.098	.461	4.831	.000
	Electricity	.232	.073	.365	4.549	.000
	Dining hall	.069	.034	.408	7.818	.000
	Toilets	.005	.216	.112	2.690	.009
	Playground	.084	.058	.106	1.457	.149
	Staff houses	.140	.175	.368	1.945	.005
	administration offices	.014	.097	.580	5.274	.000
	Departmental offices	.079	.161	.094	4.846	.000
	health bay	.004	.081	.564	4.986	.000

a.Dependent Variable: Quality of secondary education

Regression Equation Y= B0+B1X1+B2X2+B3X3……

According to the findings in Table 1, none of the classrooms, furniture, departmental offices, water, electricity toilets, playground and health bay were rated as very high.

From the Table, 50-60% of school principals rated physical facilities as low and very low where values were from Ksh. 0.5 million to 0.9 million and from Ksh. 0.1 million to 0.4 million respectively. 25.6% of school principals rated classrooms as

being moderate and low. All the principals raised furniture as being very low and low and furniture as fair and poor. Further, out of 148 schools considered, only 110(74.3%), 100(67.6%), and 105(71%) of schools had dormitories, staff houses and administrative offices, which are essential facilities for any learning institution to improve quality of education. Out of 148 schools, 15(10.1%) school principals rated dining hall as excellent while 53(35.8%) principals rated the facilities in their respective schools as very good. Only 57(38.5%) of principals had health bay. Statistics indicated that approximately two thirds of the schools did not have health bays indicating that school community members would spent time looking for health services in external facilities. A number of teachers comprising 59.3% stated that facilities affected quality of education much. Many of the teachers comprising 31.7% of them stated that facilities affected quality of education very much. A few of the teachers comprising 8.5% and 3% observed that facilities affected quality of education not much and not all respectively.

In support of the findings school principals and teachers stated that lack of physical facilities largely influenced quality of education as highlighted in Kenya Certificate of Secondary Education academic performance. A few teachers comprising 29(8.8%) stated that physical facilities did not have a great influence on the quality of education. Some of the students comprising 229(59.6%) stated that physical facilities are not enough. Many of the students comprising 113(29.4%) stated that some of the facilities were not in good condition. Some of the students comprising 42(10.9%) students stated that physical facilities are not enough, not spacious and negatively influenced quality of education. Observation guide showed that only 100(67.6%) had title deeds that were free without any constraints. However only 91(61.5%) schools had dormitories that were permanent buildings but 19(12.8%) were buildings of temporary nature, 15.7% were day secondary schools and did not have dormitories.

There were 134(90.5%) classrooms of permanent buildings but 14(9.5%) were temporary. Only 52(35.1%) of the laboratories were equipped but 48% were not well equipped. All the schools had toilets but they were not adequate for the number of students creating long ques to the toilets during break times. The schools that had adequate furniture were 65(43.9%) while those that had but were not adequate were 83(56.1%). In order to determine the influence of physical facilities on quality of secondary school education the students' academic performance from 2014 to 2017 was regressed against the physical facilities and the results were as shown in Table 2. From Table 2 it can be observed that physical facilities accounted for 34.9% of the variations in the quality of secondary school education as signified by the Adjusted R square of 0.349. The other 65.1% was due to other factors that were not subject to this study. These could include location of the schools, teacher's attitude, students' attitude, government policies among others. The null hypothesis was rejected because the influence of physical facilities was significant as signified by the p –value of 0 .00 which was less than the set p-value 0.05. To confirm whether physical facilities were significant predictors of quality of secondary school education, Analysis of Variance was computed and the results were as shown in Table 3. From Table 3, it can be observed that physical facilities were significant predictors of secondary school quality of education ($F(18, 129) = 49.571$, $P< 0.05$).

This means that physical facilities which include dormitories, classrooms, furniture, staff houses, department offices, administration offices, water supply, electricity supply, dining hall, toilets, health bay and play ground can be relied upon to predict the quality of education at secondary school level. To determine the actual influence of physical facilities on quality of secondary education multiple linear regression analysis was computed and the results were as shown in Table 4. From Table 4, it can be observed that physical facilities had different prediction powers. The highest being dormitories with a coefficient of .292. This means that for every one unit increase in dormitories, quality of education improved by .292 unit as signified by the coefficient .292. Out of 12 types of physical facilities eleven significantly influenced the quality of education but playground did not significantly influence the quality of education as it had a p-value of 0.149 which was greater than 0.05. The regression equation can therefore be represented as follows. Quality of secondary school education $=1.602+ 0.292X_1 + 0.227X_2 + 0.176X_3 + 0.172X_4 + 0.232X_5 + 0.069X_6 + 0.05X_7 + 0.140X_8 + 0.14X_9 + 0.079X_{10} +0.004X_{11}$

DISCUSSION

Physical facilities refers to resources that enable learning to take place. They comprise land, dormitories, classrooms, furniture, playgrounds, dining hall, health bay, toilets, water and electricity. Physical facilities was chosen as an institutional input because most studies on influence of physical facilities on school attainment have limited themselves to a few limited physical facilities. Studies by Lee, Zuze and Rose (2005), Lee and Zuze (2011) and Akinyi, Nyanzia and Orodho (2015) on influence of physical facilities on school performance chose only a few physical facilities like buildings, water and electricity. A principal stated "The government does not provide enough funds to expand infrastructure yet because of 100% transition policy the number of students have increased tremendously. The dormitories are crowded, the classes are compressed and water supply is not adequate yet water is so vital for the students and the teachers welfare and its scarcity endangers the learning process and the performance of the students." The remarks show that there is a mismatch between students enrolled and the resources availed to meet their needs. This tension lowers the quality of secondary school education. Findings in the same table indicate that all the schools had water, electricity, dining hall, and playgrounds; even so, investments made in these physical facilities are low and therefore had a low influence on the quality of secondary education. Many schools invested heavily in dining halls because dining halls would be sometimes used as multipurpose halls. In this regard a teacher indicated; "The overcrowding in the dormitories occurred because of lack of funds to build more dormitories. The students do not sleep well at night as two students share a bed. During lessons in class many students doze off or sleep thus loosing concentration and understanding of concepts. This makes the students to perform poorly in the assessment and Kenya Certificate of Secondary Education." Akomolaye and Adesua (2016) found a significant relationship between physical facilities and students level of motivation and academic performance. Adequate provision of facilities and their effective utilization promotes performance. In this respect a student stated "we suffer from overcrowding in dining halls, dormitories and classes but the worst suffering is lack of water for bathing, drinking and for general cleanliness. This state is not good for reading.

The school should provide water." The remarks show that a conducive environment is needed for learning. This finding is complemented by Murillo and Roman (2011) who established that provision of water contributes significantly to academic performance. All the Sub County Quality Assurance and Standards Officers stated that most schools in Migori County were still struggling to achieve quality education and that only a few had requisite physical facilities that are needed to facilitate quality education. During the interview a Sub County Quality Assurance and Standards Officers observed "some schools have not obtained land title deeds for their schools. Many schools still lack adequate toilets and well stocked spacious libraries. The dormitories and the classrooms are overcrowded. This makes the learning process to be stressful, uncomfortable and unhealthy for the students resulting in low achievement." Document analysis was used to get information from Audit reports, minutes of Board of Management meetings, tender committee meetings, teaching staff minute's meetings. The minutes showed the amount of money budgeted and provided for various projects such as dormitories, classrooms, dining halls, workshops, water and electricity. Some schools had spent more money than the amount of money budgeted for the projects.

Akomolaye and Adesun (2016) asserts that most of the physical facilities that are germane to effective learning /academic performance of students are insufficient in our public schools today and the ones there are not of the right quality, lack maintenance and are in dilapidated condition. Quality, adequate physical facilities create an enabling environment for learning thus enhancing quality of education. Findings from interview responses given by Sub County Quality Assurance and Standards Officers indicated that only 25% of schools had requisite physical facilities in form of classrooms, dormitories, furniture and water used to support learning. Sub County Quality Assurance and Standards Officers added that most schools had inadequate and unequipped facilities such as dining hall, classrooms and dormitories that lower the quality of education in secondary schools. In support of the same view, school principals in their responses indicated that some of the physical facilities were not available, not equipped, or could not cater for the increased learners enrolment such as playgrounds, dining hall, health bay and water. In their discussions, students pointed out that most of the physical facilities at school were in a bad state, most required repair, and maintenance while others required an overhaul or construction of new ones such as toilets, classrooms and dormitories to enhance quality education. Playgrounds are important for the physical development of the students. Adequate playground promote games and supports and enable students develop the character of teamwork, competition, discipline and achievement. Adequate playgrounds enable students to acquire physical fitness, enhance motivation, effort and alertness during the learning process thus promoting quality of education. Abagi and Ogachi (2014) have decried the scarcity of physical facilities that lower the quality of education. The study in Migori. County showed that playgrounds influenced the quality of secondary school education. Since 91(61%) had playgrounds that were valued at less than 0.9m it means the infrastructure for playground was very weak. This undermined talent development in games and sports and ultimately lowered the quality of education. Another physical facility was water. This is because water was used to maintain cleanliness for cooking and for drinking. During dry spells schools who do not have water have to move long distances to get water and this reduces time available for learning or games. The effect of wastage of time is that it reduces the quality of learning. An investigation by Murrillo and Roman (2011) established that the availability of water had an effect on academic achievement. The study on institutional inputs in Migori confirmed that water has an influence on quality of education.

Nandamuri (2012) who focused on establishing the influence physical facilities on quality of secondary school education, observed there was a 0.026 correlation coefficient between physical facilities and quality of education. The study noted there was a weak relationship between physical facilities and quality of secondary education. Compared to the findings by Nandamuri (2012), the study in Migori county established that the coefficient of correlation which was R = 0.349 was higher than 0.026 obtained by Nandamuri. However when the value of physical facilities of 0.349 in Migori study is compared to entry behaviour of 0.541 it was found to be lower. This means that entry behaviour had greater influence on the quality of secondary school education than physical facilities. This study differs from the Nandamuri study whose focus was on the status of secondary school education while this study was on the influence of inputs on the quality of secondary education. The research design of the Nandamuri study was a descriptive survey but this study used a cross sectional study.

The state of physical facilities like dining hall, classrooms, administrative offices, toilets, staff houses and departmental office is worrying to the government, parents, teachers and students. Inadequate physical facilities and a poor learning environment affects the performance of students in examinations as it demotivates them. Akomolaye et al (2016) stated that if the physical facilities are available, adequate and effectively utilised it could captivate and sustain interest to learn and invariably contribute to a high level of academic performance in secondary schools. Bacolon and Tobias (2006) on school quality and academic achievement established that basic facilities as electricity and water enhanced student outcomes. Fisher (2006) on impact of school infrastructure on school buildings reported that quality building; clean dining facilities, good air quality and conducive temperature improved student outcomes. The three studies differ in scope but are similar in focusing on student outcomes. The study on influence of institutional inputs in Migori had a broader focus of inputs of entry behaviour, physical facilities, teaching and learning resources, teacher characteristics and IGAs on quality of secondary school education. Insufficient and inadequate well ventilated dormitories with safety provisions can result in discomfort, insecurity, lack of proper sleep and rest and poor concentration during the day in class time. However where the dormitories are adequate, spacious, well ventilated, the students sleep well and concentrate better during the day when the students are in class. Indeed with increasing demand for secondary school education congestion occurs in dormitories and classrooms and reduces students capacity to learn undermining quality of education. Guo, Olel and Oander (2011) on university expansion and issues of quality education observe that congestion in physical facilities had serious negative consequences on the quality of education. However the context of the study was university the issues of quality dealt with were limited whereas the Migori study explored secondary school education and tackled a robust spectrum of issues.

When classes are overcrowded due to increased student number, learning is hampered. Where the classes are small and not well ventilated concentration of the learners is impaired as they concentrate on their discomfort. A review by Chavundika (2006) and by the World Bank (2008) state there is a relationship between instructional quality, class size and performance in national examinations. Whereas the two studies explore the relationship between instructional quality, class size and performance in National examinations, their focus and scope is different. The Chavundika study focuses on resources in science education whereas the education with emphasis on assessments. The study on institutional inputs in Migori County tackled inputs of physical facilities with focus on their contribution to quality of secondary school education. Toilet facilities influence learning outcomes. In the study in Migori County only 29(19%) of the schools had spent between 10million on toilet facilities while other 119(70%) spent less than 0.9 million This is because where toilet facilities are inadequate there is wastage of time as students have to queue and miss learning time. This affects the girls much more than the boys. Limited or poor quality toilet facilities may have differential implications for girls in terms of enrolment and attendance because of their special needs during their menstrual periods as well as their vulnerability to sexual harassment on their way to and from the toilet (Lyod, Mensch & Clark, 2000). Time, wastage and inadequate concentration lower the quality of education.

Conclusion

Schools with enough and equipped facilities which were in good state assisted the students and teachers to improve the quality of education. Some schools had physical facilities, which were rarely in use; the failure to use the facilities could be attributed to lack of competent teachers or personnel. The school management largely influenced the status of the physical facilities. On the whole physical facilities namely dormitories, classrooms, furniture, staff houses, department offices, administration offices, water supply, electricity supply, dining hall, toilets, health bay and play ground significantly influenced the quality of secondary school education.

Recommendation

The Ministry of Education, Constituency Development Fund, Non Governmental Organizations and Parents need to provide adequate physical infrastructure that are adequate and of high quality to create an enabling environment that can improve the quality of secondary school education.

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