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Adequacy of Selected School Resources and Its Influence on Learners' Academic Performance in Public Secondary Schools in Makueni County, Kenya

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Abstract

Adequacy of school resources is important in the functioning of institutions. The 100 policy on transition in Kenya has caused increased access to secondary schools without the commensurate increase of school resources leading to inadequacy. The purpose of this study was to examine adequacy of school resources and its influence on academic performance in secondary schools in Makueni County. The objective of this study was to determine the adequacy of school resources and its influence on academic performance in public secondary schools in Makueni County. The study adopted mixed methods research design, specifically convergent parallel design, and was supported by Education Production Function Theory. Research instruments were questionnaires and interview schedules. Validity was achieved through expert judgment and reliability by test-retest technique. Piloting was done in three schools. The target population was 1064 respondents, 60 principals, 1004 teachers, and 60 schools. Simple random, stratified and purposive sampling techniques were used to sample study subjects. The selected sample was 316 respondents, 30 principals, 286 teachers, and 30 schools. Data was analysed by descriptive, inferential statistics, and thematic analysis. The findings showed that adequacy of institutional resources moderately influenced students' academic performance (r=.514, p-value <0.05). The null hypothesis was rejected as the p-value was less than 0.005 significance level. Major conclusion was that there is a need to increase institutional materials. Major recommendations included that Ministry of education should increase institutional resources. This study provided information useful to education policymakers in formulating additional policies to increase resources in secondary schools.

Keywords: *Adequacy, school resources, learners' academic performance*

1.0 Introduction

Education is globally acknowledged as a vital investment in human capital as it contributes to a nation's wealth and the wellbeing of its citizens. It makes educated people make good decisions and is the cornerstone of both social and economic growth. Majority of developing nations have continued to experience myriads of challenges which are recognized by countries in striving to achieve Sustainable Development Goals and especially goal 4 in education. These challenges are as follows; insufficient school resources, low enrolments, poor standards of

education, and contributing low academic performance of the learners (Clark, 2013). To put to an end the provision of low-quality education in Sub-Saharan African countries and the growing countries UNESCO (2014) advocates that, some procedures should be addressed which comprise; supplying sufficient instructional resources and making sure there is equity in access to satisfactorily trained instructors, better remuneration and retention, construction and improvement of physical facilities which should be done as fast as possible. The Sustainable Development Goal 4 UNESCO (2015) urges countries to make sure that their people attain education of good quality and the opportunity for lifelong learning, hence, the increased demand for secondary education is witnessed in many developing countries. For this reason, the issue of resource adequacy in relation to academic performance becomes vital (UNESCO, 2011).

Resource adequacy is the quality of being desirable enough in amount to meet a certain need (Cambridge English Dictionary). There should be quality and equity in provision of institutional resources, according to enrolment, and for them to be put into effective use. Gamoran, Secada and Marrett (2006) revealed that adequacy of education resources led to advanced training of teachers on new teaching techniques which in turn contributed to those instructors teaching effectively. School principals were requested to rate what hindered learners from achieving academic excellence and they unanimously rated limited and inadequacy of education resources (Caygill, Lang & Cowles, 2010). The importance of having adequate school resources is to have them be put into effective teaching of the learners present at different school levels.

Student's academic performance is shown mostly by the grade achieved by learners after summative assessments, in this case, Kenya Certificate of Secondary Education. Students' academic performance ensures attainment of learning (educational goals), The academic performance entails elements such as personality, the level of intellectual value, skills, own inherent rewards, study behaviors, interests, self-respect, or the relationship between teacher-student (Lamas, 2015).

In Brazil, Jordan, Argentina, the United Arab Emirates, Uruguay, and Kazakhstan, heads of secondary schools complained that limited school facilities prevented effective utilization to a lower extent than in the OECD countries. Inadequacy of these learning resources hindered their maximum utilisation and had a negative influence on learning. Therefore, effective provision of institutional learning resources enhanced students' academic performance to above average (OECD, 2013).

A study done in South West Nigerian Vocational and Technical colleges (Ibukum et al., 2011) showed that physical and material resources were very few and lacked enough standard workspace for training like classrooms, workshops, laboratories, and lecture theatres. This led to underutilization and contributed to poor students' performance. For this reason, therefore the researcher was encouraged to determine how the adequacy of institutional resources enhanced the academic performance of students in high schools in the selected locale.

From the background, numerous studies have been done on adequacy of only one element of resources in different organizations, however, very few have been done on adequacy of various institutional resources (classrooms, teachers, libraries, science laboratories, computers, and revision textbooks) and how they influenced academic performance in public county secondary schools and more so in Makueni County. Therefore, there was a research gap to be explored in Makueni County, this encouraged the researcher to establish how adequacy of selected

institutional resources influenced students' academic performance in Makueni County public secondary schools.

Problem Statement

Institutional resource adequacy is very crucial in schools as it enables proper running of the operations and better achievement of institutional goals. County secondary schools in Makueni County have resources that if used effectively should produce desired students' academic performance. However, an average mean score of 4.691, considered as D+ has been achieved in Kenya Certificate of Secondary Education results from 2015-2019. This mean is benchmarked with the university entry grade, 7.00. C+. A mean of 4.691 is termed to be low when compared to the university entry grade, therefore the KCSE mean grade in county secondary schools would be considered low. Academic performance in these schools is caused by different elements among them adequacy of resources, termed to be the main cause that hinders students from achieving good grades. Several studies have been conducted to provide recommendations for the cause of action of poor performance; yet, the solution has not been fully achieved. The consequences included; many students would not go to university or further their education and losing good lifetime opportunities. Parents and the government also lose after spending a lot of money on educating them, these students would therefore fail to achieve vision 2030 goals.

Therefore, many studies have been done on adequacy of resources in different organisations and different locales, however, few were done on adequacy of institutional resources and the influence on academic performance of students in Makueni County, using mixed methods specifically (convergent parallel research design). Therefore, this study was conceptualized to determine how adequacy of institutional resources influenced academic performance of students in Makueni County secondary schools.

Study Objective

To establish the adequacy of institutional resources and its influence on students' academic performance in county secondary schools in Makueni County.

Study Hypothesis

H_0. There is no significant relationship between adequacy of institutional resources and academic performance of students in Makueni County secondary schools.

2.0 Literature Review

Adequacy of institutional resources and students' academic performance

Adequacy refers to teacher capabilities, acceptability of school buildings, and the suitability of instructional materials in relation to student population. Adequacy of resources in education enhances their utilisation and may influence achievement of institutional goals, among them the students' academic performance. Albarico (2014) revealed that secondary schools in Philippines had inadequate instructional materials when compared to the number of enrolled learners. At institutional level and teacher level, some factors inhibited teachers from ICT utilization and such obstacles were, inadequate ICT teacher skills; limited trust of teachers; insufficient instructor training; unsuitable educational programs, and low ICT access. Institutions of learning were advised to devise measures that dealt with these problems appropriately (Buabeng-Andoh, 2012). This study agrees with that of Alimi, Ehinola and Alabi (2012) who opined that in learning institutions in Nigeria, the teaching and learning areas like laboratories, classes, and libraries were poorly built, such that, classrooms were small and

congested. Well-built learning rooms which were rightly equipped improved access problems of learners motivated all the teachers and students, and encouraged full utilization of the space, therefore, enhancing academic performance. Mugure (2012) did a study on utilization of resources and their effect on education as viewed by educators in high schools in Mathioya District, Muranga County, Kenya. The researcher employed ex post facto research design and revealed that instructional materials are obtainable in majority of the learning institutions and that they are appropriately put to right use especially those connected to teaching and learning, which are also enough unlike those related to physical facilities like the libraries, agriculture and home science rooms, computer and science laboratories which were termed as insufficient. The study also found out that instructors in majority of the learning institutions were extremely not enough. It was also revealed that the infrastructure facilities, swimming pools, water sports facilities, and playground equipment were grossly insufficient. Majority of the educators did not prepare schemes of work, lesson plans, and lesson notes as required by the ministry and declined to make proper use of the necessary instructional materials. Similarly, Simiyu (2013), who did a study to determine the factors affecting the academic performance of learners in public secondary institutions of learning in Trans Nzoia West Sub County confirmed that physical resources that influence most good academic performance of students in learning institutions were the existence of a library with the right types and number of books, pertinent textbooks, teachers resources who have had the relevant training, classrooms which are adequate, as the elements that play the most important part in leading to very satisfactory academic performance of students. This finding concurs with Jean (2021) who showed that when libraries are not adequate, it leads to disinterest and low reading culture by students thus leading to lessened performance.

On the same opinion, the Rwandan Parliament, through the Senate (2011) revealed the main challenges facing all levels of the education system in the country were inadequacy of critical teaching and learning materials such as equipment, school buildings and having very scarce instructional materials (Bizimana, 2014). This led to the conceptualization of this study which was set to examine availability, adequacy, and use of resources in schools and performance of students in Makueni County public secondary schools.

Similarly, Konyango, Ogeta, Otieno and Orodho (2018) established that inadequately trained instructors in physics and unsuitable laboratory equipment essential for producing the intended results in physics were the primary consequences that contributed to learners' achievement of low grades in the subject. The educators rarely used learner–centered teaching approaches and both teachers and students had negative perceptions of doing well on the subject. Further, essential learning materials like textbooks and equipment for practical assessments were also in short supply. This finding is also in agreement with Mwaniki (2011) that inadequacy of teachers may contribute to students' ineffective teaching in those particular schools and likely poor academic results. This finding agrees with Ogbu (2015) who revealed that teaching and learning resources that are insufficient have dire impacts on effective pedagogy of courses on technology in Electrical/Electronic Engineering and that it leads to underperformance. This similarly agreed with Bello (2012) who indicated that low learner academic outcomes in learning institutions persisted if there was improper and ineffective use of available resources by instructors, students, and administrators.

Many studies have shown that physical facilities and material resources were insufficient globally, in learning institutions. An example is a study by World Bank (2008) on school library provision and reference books in secondary education in Sub-Sahara Africa, which showed that libraries and textbooks were both insufficient and unfairly dispersed among the country-

side and town schools within the locale. This finding agrees with Jean (2021) who showed that when libraries are not adequate, it leads to disinterest and low reading culture by students thus leading to lessened performance.

3.0 Methodology

The study adopted mixed methods research design, specifically a Convergent parallel research design (Creswell, Plano Clark, Guttmann & Harrison, 2003; Tegan, 2021). Convergent research design entails collecting and analyzing data using qualitative and quantitative techniques at the same time in one study and analysis done separately. The research results are then compared, integrated, and interpreted to confirm, cross-validate, or corroborate findings within the study (Creswell, 2003). The purpose of using convergent parallel research design in the context of this study is, it yields distinct but complementary findings on that topic and gives a better understanding of solving the research problem. The main reason for using mixed methods research design was to corroborate and triangulate the study findings (Creswell & Clark, 2011; Tegan 2021). In this model, quantitative data collection entails collecting data using an ex-post facto research design. The ex-post facto research design is a type of quantitative research whereby the researcher predicts the likely cause of an event that has already occurred. The research findings were then confirmed, cross-validated, and corroborated to be able to answer the research question.

4.0 Results and Discussion

The objective of the study was to establish the adequacy of institutional resources and its influence on students' academic performance. The objective was investigated by testing research hypothesis one which stated that there is no significant relationship between adequacy of institutional resources and students' academic performance in public secondary schools in Makueni County. Data were collected using questionnaires for teachers and interview schedules for principals. Quantitative data were analysed by using descriptive statistics such as means, percentages, and standard deviation while in inferential statistics, the Chi-square, ANOVA, and multiple regression that is used to predict the influence that existed between the independent variables (adequacy of institutional resources) and the dependent variable (students' academic performance). Qualitative data were analysed creating themes that were interpreted.

Adequacy of institutional resources and students' academic performance

Adequacy of institutional resources is considered by comparing the number of available resources and the current student enrolment at the time.

Teachers' responses on adequacy of institutional resources.

The study sought to determine adequacy of institutional resources and academic performance. This information was determined by use of a Likert scale questionnaire which helped the teachers' respondents rate the adequacy of the given institutional resources and students' academic performance. This 5-point Likert scale rating was used, 1-5, where 5- highest and 1 lowest, where - Strongly Agree (SA)5, Agree (A)4, Neutral (N)3, Disagree (D)2 and Strongly Disagree (SD)1. The findings were presented in the table below.

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Table 1: Responses on adequacy of institutional resources

	Statements on adequacy of institutional resources	5		4		3		2		1		Mean	SD Dev.
		N	%	N	%	N	%	N	%	N	%		
a	Classrooms with facilities are adequate	50	20	105	42	37	14.8	25	10	33	13.2	3.44	1.283
b	Science laboratories are adequate	75	30	78	31.2	33	13.2	52	20.8	12	4.8	3.61	1.244
c	Home science room with facilities is adequate	93	37.2	78	31.2	25	10	50	20	4	1.6	3.82	1.179
d	Library is adequate	106	42.4	66	26.4	23	9.2	54	21.6	1	0.4	3.89	1.187
e	Computer laboratory is adequate	104	41.6	55	22	25	10	65	26	1	0.4	3.78	1.246
f	Teachers are adequate in relation to student population	104	41.6	54	21.6	26	10.4	65	26	1	0.4	3.78	1.246
g	Textbooks per subject are adequate	98	39.2	62	24.8	23	9.2	66	26.4	1	0.4	3.76	1.235
h	Revision text books are adequate	102	40.8	73	29.2	51	20.4	23	9.2	1	0.4	4.01	1.01
i	Charts are adequate	93	37.2	81	32.4	25	10	48	19.2	3	1.2	3.85	1.154
j	Maps are adequate	106	42.4	66	26.4	24	9.6	53	21.2	1	0.4	3.76	1.235
k	Digital learning resources are adequate	46	18.4	110	44	37	14.8	24	9.6	33	13.2	4.01	1.01
l	Science equipment are adequate	75	30	79	31.6	33	13.2	49	19.6	14	5.6	3.85	1.154
m	Computers are adequate	145	58	95	38	3	1.2	7	2.8	0	0	3.89	1.182
n	Electricity supply is reliable	121	48.4	99	39.6	1	0.4	29	11.6	0	0	3.45	1.267
m	Playing fields are adequate	125	50	64	25.6	21	8.4	40	16	0	0	3.61	1.254
	Overall mean											3.53	1.118

Source: Data collection instruments.

Table 1 above shows statements presented to the respondents and frequencies of responses. Respondents were required to respond in Likert scale ordinal responses (1-Strongly Disagree, 2-Disagree, 3-Undecided, 4-Agree, 5-Strongly Agree). A mean of 1.0-3.4 would mean disagree and a mean of 3.5-5.0 would mean agree.

From the above table, majority of the respondents agreed that classrooms were adequate (62%, N=155), with a mean of 3.4 (SD=1.2). This implies that classrooms were moderately adequate. The Statistical Education Booklet by the Ministry of Education reveals that average size of a class is 41 students per class in secondary schools, however, different class sizes are evident in different counties and sub-counties (GoK 2016 p. 18). Most classrooms in Makueni County have more than the recommended class size, more than 41 students per class, probably because of the 100 percent transition.

One of the principals said this:

> *'Classrooms are never enough; this is caused by the implementation of the 100 policy on transition. Students' intake is increasing and so classes and lockers need to be increased every time. That is why you can see those tents there, they are occupied by form two's. We have already requested assistance from CDF to construct more and we are waiting with a lot of hope'* (principal -19).

These sentiments show that classrooms are not adequate. Adequacy of classes motivates both teachers and students when using them rightly without shifting to other areas during the teaching and learning process and positively influences their academic grades. This finding agrees with Olaleye, Ajayi, Oyebola and Ajayi (2017) who did a study on the effect of congested Classes on learners' achievement in chosen government-sponsored secondary institutions in Surelere Local Government of Lagos State, Nigeria, and revealed that congested rooms in which learners learn had a negative impact on the opinions of students towards their learning. It also showed that classrooms that had more than the required number of learners affected effective pedagogy. Further, it made it known that congested classes contributed to poor students achievement in government learning institutions in the area. Akinsanya (2010) on different deployment and usage of employees on academic performance in learning institutions and found that physical facilities and employees were critically insufficient, where they were provided, were not effectively used. The study also showed that school buildings, libraries, and classrooms were inadequate and this hindered desirable learning. This finding agrees with Wali, Abulfathl and Mustapha (2019) who did their study in Nigeria using correlation and survey methods and revealed that classrooms were adequate and that a conducive class environment influenced better achievement of learner academic grades in English.

Respondents agreed that computers were highly adequate forming a high percentage of (96%, N=240). This indicates computers in county secondary schools are adequate meaning that they may be well. Almost two-thirds of the respondents agreed that science equipment was adequate (62.6%, N=154). This indicates science equipment was moderately adequate. This finding concurs with Mulinge (2017) who showed enough laboratory materials and tools enhanced good learners' academic performance and that instructors' utilisation of laboratory equipment in teaching practical subjects brought a positive impact on achievement of science concepts. Many respondents agreed playgrounds were adequate (75.6%, N=189) indicating playgrounds were adequate. Playing grounds provide space for learners to play and break continuous classroom boredom, after exercises, students may accommodate more knowledge which increases performance. This finding agrees with Milambo and Pacho (2021) that playgrounds help to enhance cooperation and communication skills, they further facilitate confidence of learners, encouraging them to be responsible for their studies and thus help to improve their academic performance. Majority of the respondents showed that there was a reliable supply of electricity (88%, N=220). This indicates almost more than three-quarters of the schools have power to enable most of the school functions to run smoothly. The government of Kenya in Ministry of Education Basic Educational Statistical Booklet reveals that 87% of all public secondary schools are connected to power, 80% are connected to the national grid and 5.7% are connected to solar (GoK, 2019).

Science laboratories were adequate (61.2%, N=153). This suggests science laboratories are moderately adequate. This finding agrees with the government that according to the Ministry

of Education Basic Educational Booklet, 68% of public secondary schools are said to have at least a science laboratory (GoK, 2019 p. 19). The government is trying hard to construct science laboratories in all public secondary schools. More than two-thirds of the respondents agreed that teachers are adequate (63.2%, N=158), implying that teachers are moderately adequate. Information from The Basic Educational Statistical Booklet shows that teacher-pupil ratio in public secondary schools in Kenya is 25:1 (GoK, 2016). This suggests that some subjects are ineffectively taught, which is likely to lead to poor performance of students. Akinsanya (2010) had a similar opinion that different deployment and usage of employees on academic performance in learning institutions found that physical facilities and employees were not enough, where they were provided, were not effectively used. Moreover, school buildings, libraries, and classrooms were inadequate and this hindered desirable learning and impacted negatively students' academic scores. Similarly, Musyoka, cheloti and Maithya (2018) ascertained that adequacy of teacher resources positively influences learners' academic performance.

Many respondents agreed that textbooks were adequate (64%, N=160), showing that textbooks were adequate in county secondary schools in the county. This finding agrees with Mogaka, Kariuki and Ogeta (2019) whose finding showed that adequacy and making effective use of reference books positively enhance learner performance. According to the MoE Education Statistical Booklet, the recommended student book sharing for the core subjects that is languages, mathematics, and sciences (chemistry, biology, and physics) is 1:1 (Government of Kenya 2019). The findings reveal that textbooks are adequate at the recommended ratio of 1:1 in county secondary schools in Makueni County.

Majority of the respondents (68.8%, N=172) agreed that libraries were adequate. According to the government of Kenya, among the public secondary schools in Kenya, only 24% of them have a study library (GoK, 2019). Many respondents agreed that digital learning resources were adequate 62.4%, N=156. This shows digital learning resources were adequate in the county. This finding concurs with Lin, Chen and Liu (2017) who ascertained that adequacy and utilisation of digital learning resources enhance learners' academic achievement, however, it deviates from The National Center for Education Statistics (2018) which shows that computers and other digital learning resources were unavailable which may lead to inability by students utilise them.

With regard to the responses received from teachers on adequacy of institutional resources, a mean of 3.53 (SD=1.118) was arrived at which shows most of the respondents agreed with the statements presented in table 4.14 above, that institutional resources were moderately adequate. The findings express a different opinion from Murungi, Mutwiri and Wambua (2018) whose findings exhibited that adequacy and utilization of physical facilities in social studies was substandard and learners clambered hurriedly for those which had been obtained. Therefore, an average value was achieved meaning that institutional resources are moderately adequate in many learning institutions. This would lead to effective utilization and improved academic performance of students in county secondary schools in Makueni County.

Principals' response on adequacy of institutional resources

The study sought to establish principals' responses on adequacy of institutional resources. This information was collected from the principals' interviews. The number of '*yes'* and '*No's'* from the principals were tallied and the following data were collected. The findings are presented in the table below.

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Table 2 Principals' response to adequacy of institutional resources

	The institutional resource	Yes	No	Yes	No
A	Classrooms	13	17	43.33%	56.67%
B	Science laboratory	3	27	10.00%	90.00%
C	Equipped Computer lab	7	23	23.33%	76.67%
D	Teachers	2	28	6.67%	93.33%
E	Textbooks	21	9	30.00%	70.00%
F	Computers	11	19	36.67%	63.33%
G	Electricity	26	4	86.67%	13.33%
H	Playgrounds	9	21	30.00%	70.00%
	Averages	**10**	**20**	**33.33%**	**66.67%**

Source: Data collection instruments.

Table 2 above shows that (93.33%, N=28) of the principals disagreed that teachers are adequate. Teachers should be sufficient according to student population so that they may perform their duties effectively and make use of all the available institutional resources. In doing this they complete the syllabus in time, revise thoroughly and increase students' performance. Student-teacher ratio in public secondary schools currently stands at 29:1. This is according to the Ministry of Education Basic Educational Booklet 2019 (GoK, 2019). Teachers were also noted as inadequate from principals' interview schedule, where principal number 5 quoted the following:

> *"It becomes very critical when teachers are inadequate, yet they are the main implementers*
>
> *of the curriculum, how will there be effective teaching? More so, with the 100 percent policy*
>
> *on transition, students are very many in classes. I have severally requested additional*
>
> *teachers from Teachers Service Commission, but all in vain. I employ BoM teachers, some*
>
> *of whom are not qualified, sometimes we are forced to employ former form four leavers*
>
> *who had excelled but have no teaching methodology. The parents are complaining when*
>
> *their students perform poorly, actually, as a school manager I'm perplexed" (*Source: Principal 5).

These sentiments show that teachers in these schools are inadequate, this increases student-teacher ratio and lessens contact time between teachers and learners. Therefore, this would explain why the academic performance of students is low in county secondary schools. This finding concurs with Qasim and Arif (2014) which revealed that in general, the whole school's academic surroundings, including educators were disappointing in both private and public secondary schools in Pakistan. The findings expressed the same opinion as Caygill, Lang and Cowles (2010) that scarcity of educators was noted as preventing the institution's ability to provide effective teaching and learning to all students in a class. Also, in agreement was a study by Akinsanya (2010) done on different deployment and usage of employees and how it influences academic performance in learning institutions found that physical facilities and employees were critically inadequate, where they were provided, were not effectively used,

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Majority of the respondents reveal that (90%, N=27) principals, disagreed that science laboratories, were adequate. This implies that science laboratories are inadequate. Thus, practical subjects like biology, chemistry, and physics may not be effectively taught contributing to under-teaching and likely low students' academic performance. Mulinge (2017) had the same opinion that adequate laboratory materials and tools influenced learners' academic grades positively and that instructors' utilisation of laboratory equipment in teaching practical subjects brought a positive impact on achievement of science concepts. However, there posed a big challenge in supplying adequate science equipment to the school managers. Many principals disagreed that equipped computer laboratories are adequate (76.7%, N=23). This means computer laboratories are inadequate. Electricity supply was reliable (86.67%, N=26). This suggests there is smooth teaching and learning within those county schools.

Further, (33.33%, N=10) of the principals agreed to have adequate resources while (66.67%, N=20) of them disagreed. This shows most of the institutional resources in county secondary schools are inadequate. Inadequacy of institutional resources may be caused by increased enrolments by 100 percent transition policy being implemented in secondary education in Kenya. Other institutional resources that had highest shortage included digital learning resources, books for practical subjects, science laboratories, learning resource centres, and agriculture tools.

Relationship between adequacy of institutional resources and students' academic performance in public secondary schools in Makueni County.

H_{01}: *There is no significant relationship between adequacy of institutional resources and students' academic performance in public secondary schools in Makueni County*.

Research objective sought to establish the adequacy of institutional resources and its influence on students' academic performance in public secondary schools in Makueni County. This objective is also addressed by testing hypothesis 1 which stated that: There is no significant relationship between adequacy of institutional resources and students' academic performance in public secondary schools in Makueni County. The hypothesis was investigated by use of the Chi-square (χ^2) test, at 0.05 level of significance and 1 degree of freedom.

If the p-value is smaller than a 0.05 significance level the null hypothesis is rejected, as opposed, if the p-value is greater than 0.05 level of significance, then the null hypothesis is accepted. The results are shown in table the below.

Table 3: Results of hypothesis

Independent variable	Hypothesis	Chi-sq. value	df	Chi-sq. p-value	Sig. Value	Result	Decision
Adequacy of institutional resources	H0	31.90	10	0.000	0.05	0.000<0.05	H02: Rejected

Source: Data collection instruments.

Table 3 above shows a chi-square test of independence computed comparing the frequencies of adequacy of institutional resources and students' academic performance in public secondary schools in Makueni County. A significant interaction of (X^2 (10) =31.90, p<0.05) was found, implying adequacy of institutional resources affected students' academic performance in public secondary schools in Makueni County. Therefore, the null hypothesis is rejected and the alternative one accepted that there is a positive significant relationship between adequacy of institutional resources and students' academic performance in Makueni County public

secondary schools. Linear regression was conducted and the results are shown in the model summary in table 4 below.

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.514[a]	.264	.227	.923958

Source: Data collection instruments.

From table 4 above, the R-value was 0.514 representing correlation coefficient. It indicated a relatively strong degree of correlation. The adjusted R Square value of 0.264 indicated how much of the dependent variable, "students' performance", could be explained by adequacy of institutional resources. In this case, 26.4% of students' performance variability could be explained to be a result of adequacy of institutional resources. The R square and adjusted R squared had a minimal difference, implying that adequacy of institutional resources is predicated on students' performance. That meant that 73.6% of the variation in student performance could not be explained by adequacy of institutional resources. This can be deduced that there may be other factors other than adequacy of institutional resources that are affecting students' academic performance in the county. To check how well the sample data fitted in the regression model, *F* value was obtained. The model summary of ANOVA was shown in table 5 below.

Table 5: Goodness of Fit Summary for Adequacy of Institutional Resources

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	77.016	12	6.418	7.091	.000[b]
	Residual	214.500	237	.905		
	Total	291.516	249			

a. Dependent Variable: Academic Performance

b. Predictors: (Constant), Adequacy of Institutional Resources

Source: Data collection instruments.

From table 5 above, adequacy of institutional resources helped to explain variation in student performance. This was demonstrated by *F* value $F(12,371) = 7.091$, $p < .05$ indicating that the model was justifiable for the regression equation. Accordingly, R^2 which was 26.4% was significant. A multiple regression check was done to examine the effect of adequacy of institutional resources on student performance in Makueni County. This was shown in Table 6 below.

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Table 6: Regressions on Adequacy of Institutional Resources.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.024	0.297		10.17	0
	Classrooms with facilities are adequate	0.393	0.123	0.466	3.179	0.002
	Science laboratories are adequate	-0.192	0.179	-0.221	-1.073	0.285
	Home science rooms with facilities are adequate	0.372	0.095	0.419	3.907	0
	Library is adequate	-0.202	0.112	-0.234	-1.81	0.072
	Computer laboratory is adequate	0.116	0.124	0.141	0.938	0.349
	Teachers are adequate in relation to student population	0.027	0.163	0.032	0.164	0.87
	Textbooks are adequate per subject	0.098	0.166	0.121	0.591	0.555
	Revision text books are adequate	-0.023	0.094	-0.025	-0.247	0.805
	Science equipment are is adequate	-0.142	0.124	-0.168	-1.147	0.252
	Computers are adequate	0.253	0.071	0.281	3.556	0
	Electricity supply is reliable	-0.289	0.128	-0.341	-2.264	0.024
	Playing fields are adequate	-0.004	0.174	-0.005	-0.024	0.981

a. Dependent Variable: mean score

Source: Data collection instruments

The standard beta coefficients in Table 6 above indicated that adequacy of classrooms explained 46.6% of variation in student performance holding the other factors constant. Adequacy of science laboratory explained 22.1% of variation in student performance holding the other factor constant. Adequacy of home science rooms explained 41.9% of variation in student performance holding the other factors constant. Adequacy of library explained 23.4% of variation in student performance holding the other factors constant. Adequacy of computer laboratory explained 14.1% of variation in student performance holding the other factors constant. Adequacy of teachers explained 3.2% of variation in student performance holding the other factors constant.

Adequacy of textbooks explained 12.1% of variation in student performance holding the other factors constant. Adequacy of revision textbooks explained 2.5% of variation in student performance holding the other factors constant. Adequacy of science equipment explained 16.8% of variation in student performance holding the other factors constant. Adequacy of computers explained 28.1% of variation in student performance holding the other factors

constant. Adequacy of electricity explained 34.1% of variation in student performance holding the other factors constant. Adequacy of playing fields explained 0.5% of variation in student performance holding the other factors constant.

The Y-intercept of regression line was:

Y=3.024+0.393x1-0.192x2+0.372x3-0.202x4+0.116x5+0.027x6+0.098x7-0.023x8-0.142x9+0.253x10-0.289x11-0.004x12

When the adequacy of Classrooms (x1) increased by 1 unit, the academic performance (Y) increased by 3.417 units (3.024+0.393). When the adequacy of science laboratory (x2) increased by 1 unit, the academic performance (Y) increased by 2.832 units (3.024-0.192). When the adequacy of home science rooms (x3) increased by 1 unit, the academic performance (Y) increased by 3.396 units (3.024+0.372). When the adequacy of library (x4) increased by 1 unit, the academic performance (Y) increased by 2.822 units (3.024-0.202). When the adequacy of Computer laboratory (x5) increased by 1 unit, the academic performance (Y) increased by 3.14 units (3.024+0.116). When the adequacy of teachers in relation to student population (x6) increased by 1 unit, the academic performance (Y) increased by 3.051 units (3.024+0.027). When the adequacy of textbooks is adequate per subject (x7) increased by 1 unit, the academic performance (Y) increased by 3.122 units (3.024+0.098). When the adequacy of revision textbooks (x8) increased by 1 unit, the academic performance (Y) increased by 3.001 units (3.024-0.023). When the adequacy of science equipment (x9) increased by 1 unit, the academic performance (Y) increased by 2.882 units (3.024-0.142). When the adequacy of Computers (x10) increased by 1 unit, the academic performance (Y) increased by 3.277 units (3.024+0.253). When the adequacy of reliable supply of electricity (x11) increased by 1 unit, the academic performance (Y) increased by 2.735 units (3.024-0.289). When the adequacy of playing fields (x12) increased by 1 unit, the academic performance (Y) increased by 3.02 units (3.024-0.004). Resources in schools are moderately adequate and therefore there is need to increase them. Therefore, adequacy of institutional resources affected students' academic performance in public secondary schools in the county.

Summary of the Study Findings

The findings revealed that majority of the study respondents agreed that institutional resources are adequate in county secondary schools with a (Mean of 3.53, SD=1.118). This is from the teachers' responses. In this case, a mean of 3.53 means implies that the respondents agree that institutional resources are adequate in county secondary schools. Classrooms, science laboratories, computers, libraries, teachers, textbooks, computer laboratories, and playgrounds are adequate. Adequacy of institutional resources had a strong positive significant relationship with students' performance. The R-value of 0.542 represents a simple correlation. It indicated a relatively strong degree of correlation. The adjusted R Square value of 0.294 indicated how much of the dependent variable, "students' performance", could be explained by adequacy of institutional resources. In this case, 29.4% of students' performance variability could be explained to be a result of adequacy of institutional resources. The R square and adjusted R squared had a minimal difference, implying that adequacy of institutional resources is predicated on students' performance. That meant that 70.6% of the variation in student performance could not be explained by adequacy of institutional resources. This can be deduced that there are other factors other than adequacy of resources that affect students' academic performance in the county. Hypothesis 1 which stated that there is no significant relationship between adequacy of institutional resources and students' academic performance in public secondary schools in Makueni County, was tested using chi-square (χ^2) test at 0.05

significant level at 1 degree of freedom. The results showed that a significant interaction was found (X^2 (10) =31.90, p<0.05). the p-value was less than 0.05 therefore the null hypothesis was rejected and the alternative hypothesis accepted that there was a positive relationship between adequacy of institutional resources and students' academic performance in public secondary schools in Makueni County. Thematic analysis indicated that classrooms, teachers, textbooks, libraries, science equipment, computer laboratories, computers, and playgrounds were inadequate, however, only electricity supply was reliable.

Conclusion

The findings confirmed that adequacy of institutional resources in public secondary schools in Makueni County had a statistically significant influence on students' performance. The conclusion is that institutional resources are moderately adequate in county secondary schools in Makueni County.

Recommendations for policy and practice

In this section recommendations are made according to the findings and conclusions from the analysis of the data collected in the study, the following recommendations are suggested:

i. Although institutional resources are moderately adequate, there was need for schools to increase more institutional resources according to student population for the students to improve performance at KCSE in public secondary schools in Makueni County.

ii. The teachers should be trained on improvisation, collection, and production of some instructional materials from locally available resources to enhance adequacy of materials like charts, flow diagrams, and realia.

iii. It was necessary for the TSC to employ more teachers to cover the shortage of teachers in the county.

References

Albarico, S. (2014). Adequacy of Instructional Materials Used by Teachers in Teaching Technology and Livelihood Education. Department of Education Philippines.

Buabeng-Andoh, C. (2012). *Factors Influencing Teachers' Adoption and Integration of Information and Communication Technology into Teaching*: Pentecost University College, Ghana**.** International Journal of Education and Development using Information and Communication Technology *(IJEDICT)*, 2012, Vol. 8, Issue 1, pp. 136-155.

Castleberry, A. & Nolen A., (2018). *Thematic Analysis of Qualitative research Data*: Is it as easy as it sounds? Currents in Pharmacy Teaching and Learning. *Vol 10*. Students' Mathematics and Science Achievement in 2006.

Caulfield J. (2019). *How to Do Thematic Analysis | Step-by-Step Guide & Examples.* Published on September 6, 2019. Revised on July 21, 2022.

Caygill, R. Lang, K. and Cowles, S. (2010). TIMSS 2006-07: *The School Context for Year 5*.

Clune W. H., (1995). *Educational Adequacy: A Theory and Its Remedies.* 28 U. MICH. J. L. REFORM 481 (1995).

Creswell, J.W., Plano Clark V.L., Gutmann M.L., and Hanson W.E. (2003). *Advanced Mixed*

Methods research designs. In A. Tashakkori & Teddlie (Eds.*),* Handbook of Mixed Methods in Social and Behavioral Research, TO, Sage. Denzin.

Creswell, J. W., and Plano Clark V. L. (2011). *Designing and Conducting Mixed Methods Research*. (2nd Edition). Thousand Oaks, CA: Sage Publications, Inc.

Creswell, J.W. (2012). *Planning, Conducting, and Evaluating Quantitative and Qualitative Research*. (*4th Edition*). University of Nebraska-Lincoln.

GoK (2010). Kenya Education Sector Support Programme (KESSP) *Delivering Quality Education and Training to All Kenyans.* Ministry of Education. Nairobi, Kenya.

GoK (2016) Basic Education Statistical Booklet, Nairobi. Ministry of Education, Kenya.

GoK (2019) Basic Education Statistical Booklet, Nairobi. Ministry of Education, Kenya.

Hobbs, M. (2016). *what is Test-retest Reliability and why is it important*? Digital Health and Innovation. Cambridge.

Ibukum, W.O., Akinfolarin C.A., and Alimi S.O. (2011). *Correlate Resource Utilization and Students' Learning Outcomes in Colleges of Education in South West Nigeria*. International Education Studies. *Vol. 4, (No.* 3*)*. DOI: 10.5539/ies. v4n3p178.

Incheon Declaration and SDG4 (2015). *Education Framework for Action 2030.* UNESCO.Paris.

Isola, E. (2010). *Teacher's Utilization as Correlate of Student's Academic Performance in Senior Secondary Schools in Ondo State,* Nigeria. European Journal of Educational Studies, 4(2).

Jean, B. (2021). *School Library Facilities and Students' Academic Performance in Secondary Schools in Nyamasheke District-Rwanda*. ISSN Online: 2616-8383. Journal of Education. Published: 2021-02-11. Vol 4 No 1 (2021).

Kahiti, M., Otieno, P. O. & Adero, C. (2016). *Basic Education Statistical Booklet, Ministry of Education*, Kenya.

Konyango B. O., Ogeta N.O., Otieno M., & Orodho J. A. *(2018). Influence of Resources on Students' Academic Performance in Physics at Secondary Schools in Ugenya Sub County, Siaya County, Kenya*. DOI: 10.15580/GJER.2018.5.072118101. Vol. 8(5), pp. 111-118, July 2018 ISSN: 2276-7789.

KUCCPS, (2019) Kenya Universities and Colleges Central Placement Service.

Lamas, H.A. (2015). *School Performance.*Vol.3, No (1): pp. 313-386.DOI http://dx.org/10.20511/pry2015.v3n1.74. ISSN 2307-7999.

Mangendi D. (2019). *Influence of Understaffing of Teachers on Teaching and Learning in Public Primary Schools in Kenya*. Corpus ID: 210760233. Education.

McHugh, M. L. (2013). *The Chi-square test of independence*. Biochem Med (Zagreb). 2013 Jun; 23(2): 143–149. Published online 2013 Jun 15. Doi: 10.11613/BM.2013.018.

Middleton, F. (2019). *Reliability vs. Validity: What is the Difference*? www.scribbr.com

Milambo, M. and Pacho, T. O. (2021). *Influence of Sports and Games on Enhancing Students 'Academic Performance in Public Secondary Schools in Nyamagana District.* Department of Educational Foundation, St. Augustine University of Tanzania, Mwanza, Tanzania. *Journal of Humanities and Education Development (JHED) ISSN: 2581-8651 Vol-3, Issue-1, Jan – Feb 2021.*

Mogaka, M. M, Kariuki S. I. and Ogeta N. (2019). *Availability and Utilization of Textbooks on Students' Academic Achievement in Public Day Secondary Schools.* International Journal of Research and Innovation in Social Science (IJRISS). Volume III, Issue VII

Mugure, N. S. (2012). Impact of Resource Utilization in Education as Perceived by Teachers in Secondary Schools in Mathioya District, Muranga County, Kenya.

Mulinge, N. M. (2017) *Influence of Laboratory Facilities on Students' Performance in Science Subjects in Public Secondary Schools in Machakos Sub-County, Kenya.*

Murungi, C. G., Mutwiri, C. and Wambua M. M. (2018). *Physical Facilities and Strategies used by Teachers to Improve Pupils' Performance in Social Studies in Makueni County.* 2018; 4(6):241-245. DOI: 10.15406/ipcb.2018.04.00134.

Musyoka, J. M., Cheloti, S. K. & Maithya, R. (2018). *Influence of Teacher Adequacy on Students' Performance in KCSE in Public Secondary Schools in Kenya*. A Case of Kathiani Sub County, Machakos County. *International Journal of Humanities and Social Science Invention, 7* (1), 50-58.

Mwaniki M. W. (2011). *School-Based Factors' Influencing on Student Performance in Kenya Certificate of Secondary Education in Murang'a, Kenya.*

Ndugu, M.M., (2014). *Quality and Productivity of Teachers in Selected Public Secondary Schools in Kenya*. Mediterranean Journal of Social Sciences.

Njuguna, K.S. (2018). *Access and Utilization of Instructional Materials in Teaching and Learning of Biology in Nairobi*. Kenya.

OECD, (2008). Education at a Glance 2008: OECD Indicators.

OECD, (2013). *What makes schools Successful? Resource, Policies, and Practices. Vol. 4.* OECD Review of Policies to Improve the Effectiveness of Resource Use in Schools (School Resources Review) Design and Implementation Plan for the Review.

Ogal, (2015). *Strategies for Enhancing Teachers' Job Satisfaction and Academic Performance Among Secondary Schools in Homa-Bay County,* Kenya. Department of Education, Mount Kenya University, Eldoret, Kenya.

Ogbu, J. E. (2015). *Influences of Inadequate Instructional Materials and Facilities in Teaching and Learning of Electrical/Electronic Technology Education Courses*. Journal of Education and Practice www.iiste.org ISSN 2222-1735 (Paper) ISSN 2222-288X (Online) Vol.6, No.33, 2015 39.

Okoli, B.E., and Okorie O. (2015). *Adequacy of Material Resources Required for Effective Implementation of Upper Basic Education Business Studies Curriculum in Nigeria*. Ebonyi State University.

Oni, J: (1995). *Educational Resources: An Introduction*. Abeokuta: Gbemi Sodipo press ltd.

Ordu, R. & Amadi, E. (2019). *Utilization of Instructional Materials and Students' Academic*

Performance in Junior Secondary Schools in Selected Local Government Areas, Rivers State. International Journal of Innovative Social & Science Education Research 7(3):54-62, ISSN: 2360-8978. Rivers State University, Port Harcourt. Nigeria.

Orodho, J. O (2009). *Fundamentals of educational research in social sciences*. KANEZJA HP ENTERPRISES. Maseno/Nairobi, Kenya.

Simiyu, M. N. (2013). *Factors Affecting Academic Performance in Secondary Schools in Kenya*: A Case Study of Trans-Nzoia West District.

Teeboom, L. (2019). *The advantages of Regression Analysis and Forecasting*. Advertising and Marketing.

Taherdoost, H. (2016). *Sampling Methods in Research Methodology; How to Choose a Sampling Technique for Research.* Hamta Group.

Tegan, G. (2021). *Mixed Methods Research / Definitions. Guide and Examples.*

UNESCO, (2008). *Education for All by 2015. Will We Make It?* Education for All Global Monitoring Report. UNESCO. Paris.*unesco.org/new.* UNESCO Digital library.

UNESCO, (2011). *School Infrastructure and Resources do Matter: analysis of the incidence of School Resources on Performance of Latin American Students. School effectiveness and school Improvement.* 22(1), 29-50, 2011. Unesco.org. UNESCO.

UNESCO (2014). *Teaching and Learning: Achieving Quality for All. EFA Global Monitoring Report 2013/2014.* Paris: UNESCO. Retrieved on www. UNESCO.org, accessed on 26/05/2014

UNESCO, (2015). *Education for All by 2015: will we make it? Initiatives to improve the quality of teaching and learning.* unesco.org.

Usman, Y. D. (2016). *Educational Resources: An Integral Component for Effective School Administration in Nigeria.* Federal Road Safety Commission (FRSC) RS4.35 Nassarawa Eggon Unit Command, Nasarawa State, Nigeria. *Vol.6* (No. 13).

Wambugu, L (2021). Quantitative Research Designs: Survey, ex post facto, and Experimental.

World Bank, (2008). *Text Book and School Library Provision in Secondary education in Sub-Saharan Africa.* Washington, D.C: African Region Human Development. Department.

Yamane, (1967). *Determining Sample Size for Research Activities*. Tarleton State University.