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Effect of Students Exposure to Biology Practicals on Performance in Public Secondary Schools in Lugari Sub County, Kakamega County, Kenya

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Abstract: **This research was aimed at examining effect of students' exposure to biology practicals on performance in public secondary schools in Lugari Sub County, Kakamega County, Kenya. The specific hypotheses were Students' exposure to biology practicals does not significantly affect performance in public secondary schools, Presence of laboratory does not significantly intervene the effect of students' exposure to biology practicals on performance in public secondary schools and number of biology teachers does not significantly moderates the effect of students' exposure to biology practicals on performance in public secondary schools in Lugari Sub County, Kakamega County, Kenya. It was a survey study that made use of the sample of 13 secondary schools in Lugari Sub County using simple random sampling. Data was collected from four students of the sampled schools. Data were obtained using the primary method of the questionnaire of data collection. Secondary data was obtained from Kenya National Examination Council Database as well as individual schools records in regard to number of biology teachers and functional laboratories. From the result, it was found that student exposure to practical biology has a positive effect on performance of biology subject. However, currently, student exposure to biology practicals currently contributes up to 9.5% changes in biology performance. Presence of laboratory significantly improved the contribution of students' exposure to biology practicals from 9.5% to 12.1%. Further, the moderating effects of number of biology teachers strengthen the effect of students' exposure to biology practicals as the contribution moved from 9.5% to 52.6%. The study recommended that government should construct and equip laboratories while principals should provide biology teachers with fund for consumables. The curriculum planners can moderate the time allocated to certain tasks. School administrators should endeavour to create a work strategy that will ease teacher workload to give them time for lesson preparation for practical activities. Experienced teachers should be used as resource for training other teachers. Finally, the Government, through the Teacher service commission should employ more biology teachers while Board of Management should employee more teachers to ease burden exerted on TSC teachers**

Keywords: **Biology, Students' Exposure, Biology Practicals, Biology Performance, Number of Teachers, Laboratories.**

1. INTRODUCTION

Biology as one of the science subject is defined as the study of life and structure of living things. Biology is the study of living things and concerns itself with the study of the structure, behaviour, distribution, the origin of plants and animals and their relationship with their environments. Like other science subjects, biology in secondary schools is composed of practical activities. In all the sciences, biology geared towards simplifying the theoretical content, so as to enhance effective instruction and learning of the subject. Stephen and Longinus (2018) stated the reason for emphasizing practical activities in biology like a realization of practical; work to be predecessor to real science knowledge.

Practical work stimulates learner interest in the science subject they are studying, when they are made to personally engage in useful activities; knowledge obtained through practical; work and experience, promote long term memory that theory alone cannot do, from this reason, it becomes obvious that a learner acquired more in any science lesson, if giving the opportunity to do activities, ranging from manipulating apparatus, classifying, designing, experimenting, hypothesizing to maker inferences and verifying results. Hence, there is an urgent and serious need to justify the exposition of the students biology practical activates as well as studying its effect on student's achievement in biology. (Uche, 2018)

In Kenya, Biology syllabus recommends teaching through discussion on practical activities, field trips, demonstration and project (Kenya Institute of Education, 2018). This encompasses theory and practical work. Gacheri and Dege (2014) notes teaching methods or strategies currently recommended process-based approach of teaching to help students learn science process skills. These include laboratory work, field and project work. The curriculum developers in Kenya advocate for learner-centered approaches in teaching of science in secondary schools (Kenya Institute of Education, 2013). But most teachers in schools still use traditional written approaches, whereas practical and projects are rarely used.

Biology practicals are very important because of good quality practical activities promote the involvement and interest of student as well as developing a lot of skills and knowledge of the subject, as well as conceptual understanding of the subjects. Although there are good examples of practical activities in schools, these have only been in the second cycles of the lower sixth and upper sixth of our schools. Unfortunately, the ugly situation observed in the majority of our secondary school and students in lack of exposure of the students to practical activities. This contributes to persistent poor performances in biology (Kisangi, 2016).

Performance in the KCSE practical paper has frequently been below 50% despite the fact that the ministry of education in corporation of other bodies has come up with stringent strategies to improve the teaching and learning of sciences, performance in Biology remains poor. To this end a notable intervention has been the Strengthening of Mathematics and Sciences in Secondary School Education (SMASSE) project. However, even with interventions such as SMASSE, according to Sifuna and Kaime (2007) teachers are still constrained when it comes to conducting practicals as a way of teaching sciences. Students' performance in Biology in Lugari Sub County has been wanting and this has generated great concerns amongst education stakeholders. In 2019 the subject mean score was below the national mean score.

Statement of The problem

For the past three years, performance in biology has been on a downward trend, raising fears that many students continue to be locked out of courses that require decent grades in the subject, especially medicine courses. The desire to know the causes of the poor performance in biology has been the focus of researchers for some time now. It has been generally observed that poor performance in the sciences is caused by the poor quality of science teachers, overcrowded classrooms, and lack of suitable and adequate science equipment, among others. However, few studies have investigated the nexus between students' exposure to practicals and performance in public secondary schools in Lugari Sub County, Kakamega County, Kenya. Therefore, the study sought to test the following null hypotheses.

i. H_{01}: Students' exposure to biology practicals does not significantly affect performance in public secondary schools in Lugari Sub County, Kakamega County, Kenya.

ii. H_{02}: Presence of laboratory does not significantly intervene the effect of students' exposure to biology practicals on performance in public secondary schools in Lugari Sub County, Kakamega County, Kenya.

iii. H_{03}: Number of biology teachers does not significantly moderates the effect of students' exposure to biology practicals on performance in public secondary schools in Lugari Sub County, Kakamega County, Kenya.

2. LITERATURE REVIEW

Theoretical Framework

The General System Theory (GST) was used as the theoretical framework for this investigation. System theory, according to Higgs and Smith (2018), is a general science of organization and wholeness. It's also a philosophy that asserts that life is a system in which we are all participants. The essential assumptions in system theory are that everything, including humans, is a system of some form, and that all systems are purposeful and goal driven (Higgs and Smith 2018). All parts

of a system must work in harmony with one another and their surroundings in order to achieve the system's goals. Von Bertalnffy, a biologist, proposed the General System Theory (GST) in 2018. His assumptions were essentially about biological creatures, machines, galaxies, and organizations. He proposed that parts of a system do not work in isolation, but rather as part of a larger system. His hypothesis contradicted a widely held scientific belief that a system might be better understood by breaking it down into its constituent parts and studying and analyzing each one separately. And that the components might be added in a linear order to describe a system's totality. Bertalnffy (2018) defined a system as a collection of interconnected elements. It is possible to close or open the system. The school is an example of an open system, in which two or more people collaborate to achieve common objectives (Norlin 2015).

All schools operate on an open system, albeit the degree of engagement with the outside world varies. The school is a system made up of the following elements: inputs, transformations, outputs, and feedback. The open system is one that receives input from the environment and returns output to it. Any change in the environment has the potential to have a significant influence on the open system. Parts of the system work together to help the school system succeed or to determine the root of a problem and, as a result, to find a solution. Because the school is an example of a social open system with aspirations to achieve excellence in all areas, this theory was chosen for this study.

One of the key purposes of biology education in secondary schools is to provide students with the skills and attitudes of scientists that will enable them to pursue professional courses at universities such as medicine, dentistry, pharmacy, and nursing, among others (Abugu 2015). However, this will not be possible until the many parts/aspects of biology (theory and practice) work in concert to create the intended result. In this study, every facet of biology teaching and learning could have an impact on the students' examination results. If one part of the system fails, the result will be bad; but, if all aspects of the system operate together, meaningful learning will be attained, and students' academic performance will improve.

Conceptual Framework

Figure 1. shows the conceptual framework that guided the student. The independent variable was exposure to biology practicals, while presence of laboratory was used as intervening variable. Number of biology teachers was used as moderating variables while biology performance was used as dependent variable.

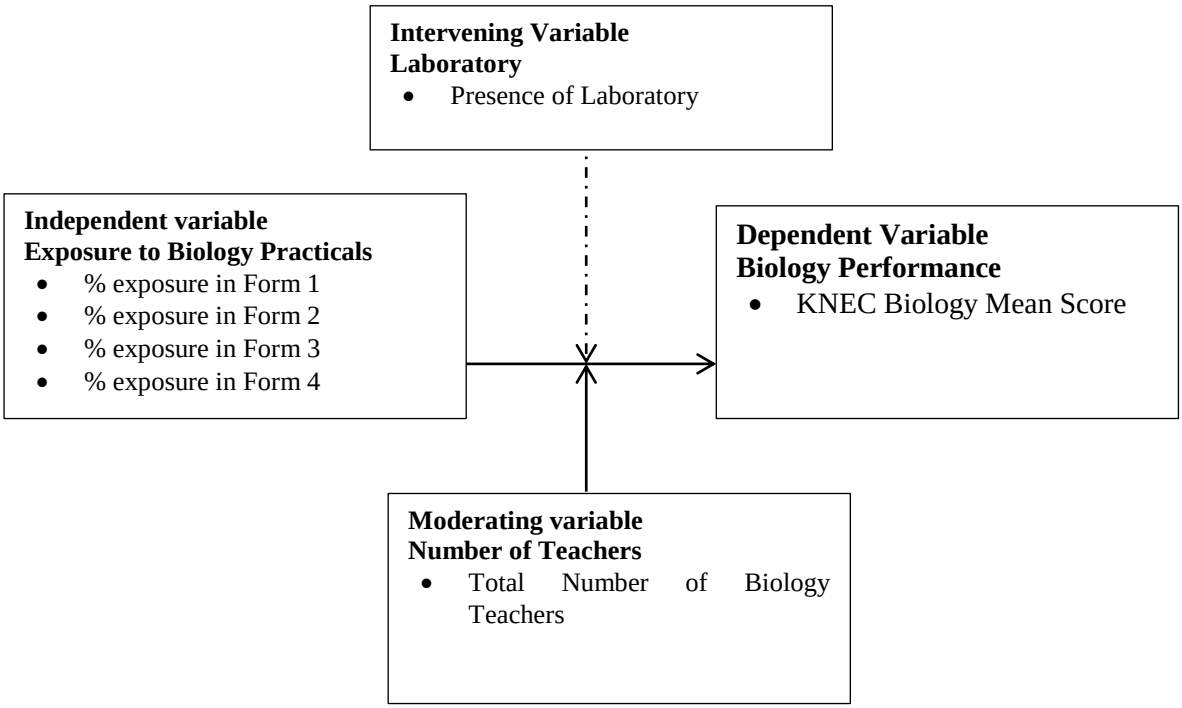

Figure 1: Conceptual Framework

Related Empirical Studies

Ude and Ebuoh (2018) investigated the effect of Biology practical activities on the academic achievements of senior secondary school biology students in Awgu Local Government Area of Enugu State. The findings of the study showed that students taught biology using practical activities performed better than their counterparts using conventional method. The result also showed that gender has significant difference on students‟ performance when taught with practicals. The researchers therefore recommended that teachers should employ practical activities in teaching biology to enhance students‟ performance.

Effiong and Odey (2013) investigated the effect of Biology practical activities on the academic performance of secondary school students in cross river state. Findings from the research showed that there is a significant difference on the academic performance of students taught with practical Biology activities. Also, there is a significant influence of gender on the academic performance of students offering Biology. Kambaila, Kasali and Kayamba (2019) explored how practicals work affects the academic performance of learners in biology sciences using pre-test and post-test approach for the quasi-experimental control group (CG). From the results, the average means were statistically distinct indicating that practical biological work substantially enhanced the learner's performance. Also, statistical testing in the performance between boys and girls in the EG which meant that the performance was collectively enhanced. The integration of practical work in teaching biology or any science topics will, therefore, positively improve learner's performance.

Ude and Ebuoh (2018) investigated the effect of Biology practical activities on the academic achievements of senior secondary school biology students in Awgu Local Government Area of Enugu State.. The findings of the study showed that students taught biology using practical activities performed better than their counterparts using conventional method. The result also showed that gender has significant difference on students' performance when taught with practicals. The researchers therefore recommended that teachers should employ practical activities in teaching biology to enhance students' performance.

Ezra and Agah (2019) investigated the effect of practical teaching method on academic achievement of senior secondary biology students in Mubi Educational Zone, Adamawa State. The findings show that there is significant difference in the effect of practical method and lecture method on students' academic achievement in biology. The result also shows that male students had higher mean score gain than their female counterpart when taught biology using practical method. It was recommended that government should organized training, seminars and workshops for both Biology teachers and Laboratory technicians in order to harmonize theoretical aspect of teaching Biology with practical activities.

Maina (2015) aimed at determining influence of competence in procedure, execution, observation and interpretation skills on performance in practical Biology and subsequently performance in Form Three students in Kiambu County as represented by sample drawn from Thika West Sub-County (TWSC). The findings of the study unearthed a significant relationship between students' competence in practical skills and performance that is ultimately reflected in KCSE results. The findings indicate that competence is highest in observation skills and low in execution, and interpretation skills. This study recommends teachers to use methodology that facilitates competence in these skills. From the findings procedure skill is rote learned.

Malongo (2015) examined the impact of school based practical assessment on learner achievement in biology in secondary schools in Kakamega County, Kenya. The results revealed that practical process skills pedagogy was more effective mode of teaching and learning because students in experimental class where practical process skills observation, experimenting, drawing and measurement were integrated performed better. They had superior mean scores with t values for t-test less than p values. Practical approach to teaching from research showed had significant positive impact on performance in Biology in secondary schools. Experimental group that integrated practical approach to instruction performed better because better teaching strategy .Findings would be useful to education ministry to guide curriculum review. This may influence teacher training especially area of pedagogy and ministry to strengthen quality assurance unit to oversee schools undertake holistic science teaching and assessment through acquisition of practical process skills.

3. METHODOLOGY

The design adopted for this study is a survey research design. This study was carried out in public secondary schools in Lugari Sub County, Kakamega County. The population of this study comprised of the entire twenty five (25) public secondary schools in the sub county. The sample size for the study consists of 13 schools randomly drawn from 25

schools in the county. Simple random sampling technique was used to select 13 schools out of the entire 25 secondary schools. The study purposively sampled form four students since they have completed the four years course in secondary school. The study collected both primary data and secondary data. The questionnaires were administered to collect primary data which measured student exposure while secondary data on performance was collected from Kenya National Examination Council. Data was analyzed using descriptive statistics as well as inferential statistics. Inferential statistics included linear regression analysis. To predict biology performance from students' exposure to biology practicals, the following model was used:

$Y=\alpha+\beta_1X_1+ \beta_2X_2+ \beta_3X_3+ \beta_4X_4+\varepsilon$

Where Y is KNEC Biology Performance

X_1 is Biology Practical Exposure in Form 1

X_2 is Biology Practical Exposure in Form 2

X_3 is Biology Practical Exposure in Form 3

X_3 is Biology Practical Exposure in Form 4

ε is error term

α is constant

β_1—β_4 is regression coefficients

4. FINDINGS AND DISCUSSIONS

Extent of Learners Exposure to Biology Practical in Lugari Sub County

The study sought to establish to extent to which thirteen secondary schools in Lugari Sub County have conducted 113 practical from form one to form four. However, not all practical sessions were undertaken as indicated by overall 38.35% practical done during study period. The distribution of practical per class is as shown in Table 1 below.

Table 1: Overall Extent of Learners Exposure to Biology Practical in Lugari Sub County

Class	Number of Practical	Percentage
Form 1	26	41.7%
Form 2	26	30.3%
Form 3	35	48.1%
Form 4	26	33.3%
Total	**113**	**38.35%**

There are a total of 26 practical sessions in Form one, however, averagely, 41.7% of them were conducted during the study period. The study also established that there was significant variation in number of practical lessons conducted from one school to another. For instance, three schools conducted 13 practical sessions in form one while one school conducted 26 practical lessons. Similarly, there are a total of 26 practical sessions in Form two, however, averagely, 30.3% of them were conducted during the study period. The study established that there was significant variation in number of practical lessons conducted from one school to another. For instance, three schools conducted 4 practical sessions in form two while two schools conducted 21practical lessons. None of the schools conducted all 26 practical session in form two. Most of the practical sessions are in form three (35), averagely, 48.1% of them were conducted during the study period. However, three schools conducted only 6 practicals in form three while one conducted maximum practicals (35). Form four have 26 practical sessions, averagely, 33.3% of them were conducted during the study period. However, three schools conducted only 3 practicals in form three while one conducted maximum practicals (26). The average practical done in Lugari Sub County was 38.35% which is way far below expected number of practical during the four years.

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Kenya National Examination Council Biology Academic Performance (2019)

Secondary was collected to examine how Kenya National Examination Council Biology exam was performed among the thirteen schools. The results are as shown in Table 2.

Table 2: Academic Performance

	Statistics
N	13
Minimum	2.02
Maximum	4.16
Mean	2.86
Standard Error	0.160
Standard Deviation	0.577

Source: KNEC (2020)

Table 2. shows how biology was performed among 13 schools in regard to Kenya National Examination Council in 2019. The minimum mean score was 2.02 while the maximum mean score was 2.86 with a standard deviation of 0.577. The mean score of 13 schools (23.83) was way below the national mean score of 51.38

Effect of Exposure to Biology Practicals on Academic Performance

The study sought to establish the relationship between exposure to biology practicals and academic performance. This was achieved by conducting linear regression to establish the R square, coefficient of determination as well as predicting biology performance from exposure to biology practical. The results are shown in table 3

Table 3

Model Summary

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	.307[a]	.095	.082	.519925	.095	7.376	4	283	.000

a. Predictors: (Constant), KNEC_MEAN_SCORE

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	5.575	1	5.575	20.208	.000[b]
	Residual	78.902	286	.276		
	Total	84.477	287			

a. Dependent Variable: PE_FORM1, PE_FORM2,PE_FORM3,PE_FORM4

b. Predictors: (Constant), KNEC_MEAN_SCORE

Coefficients[a]

Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**
	B	**Std. Error**	**Beta**		
(Constant)	1.237	0.821		1.506	0.999
PE_FORM1	0.650	0.229	0.558	2.84	0.005
PE_FORM2	0.388	0.149	0.304	2.604	0.011
PE_FORM3	0.468	0.165	0.422	2.836	0.008
PE_FORM4	0.442	0.186	0.423	2.383	0.021

a. Dependent Variable: KNEC_MEAN_SCORE

PE-Practical Exposure

From the model summary in Table 3, the coefficient of determination (R-squared) of 0.095 showed that 9.5% of biology performance in secondary schools in Lugari sub county, Kakamega County could be explained by exposure to biology practicals. The adjusted R square of 8.2% depicts that the exposure to biology practicals in exclusion of the constant variable explained the change in biology performance in secondary schools in Lugari sub county, Kakamega County by 8.2%, the remaining percentage could be explained by other factors not included in the model. The correlation coefficient of exposure to biology practicals (R=0.307) in Table 3 showed that there is a strong positive relationship between biology performance in secondary schools in Lugari sub county, Kakamega County and exposure to biology practicals from form one to form four. The standard error of estimate (0.520) shows the average deviation of the independent variable from the line of best fit. From the ANOVA results Table 3 in model one shows that there is a significant relationship between biology performance in secondary schools in Lugari sub county, Kakamega County and exposure to biology practicals ($F=20.208$, p-value <0.001). Further, From the ANOVA Table, both models were statistically significant for the data as the p value<0.001.

Predicting Biology Performance from Exposure to Biology Practicals

From the findings presented in Table 3, we look at the model results and scan down through the unstandardized coefficients B column. The following model was developed based on the regression coefficients

$Y=1.237+0.650X_1+0.388X_2+0.468X3+0.442X_4$

Where Y is KNEC Biology Performance

X_1 is Biology Practical Exposure in Form 1

X_2 is Biology Practical Exposure in Form 2

X_3 is Biology Practical Exposure in Form 3

X_3 is Biology Practical Exposure in Form 4

All biology exposure constructs had significant effect on biology performance in secondary schools in Lugari sub county, Kakamega County. If exposure to biology practicals are held at zero or it is absent, biology performance in secondary schools in Lugari sub county, Kakamega county would be 1.237, p=0.999 though positive and insignificant. It was revealed that exposure to biology practicals in form one had unique significant contribution to the model with B=0.650, p=.005 suggesting that controlling other variables in the model, a unit increase in exposure to biology practicals in form one would result to significant increase in KNEC biology performance by 65.0%.

It was also revealed that exposure to biology practicals in form two had unique significant contribution to the model with B=0.388, p=.011 suggesting that controlling other variables in the model, a unit increase in exposure to biology practicals in form two would result to significant increase in KNEC biology performance by 38.8%. The findings indicated that exposure to biology practicals in form three had unique significant contribution to the model with B=0.468, p=.008 suggesting that controlling other variables in the model, a unit increase in exposure to biology practicals in form three would result to significant increase in KNEC biology performance by 46.8%. Lastly, the results revealed that exposure to biology practicals in form four had unique significant contribution to the model with B=0.442, p=.021 suggesting that controlling other variables in the model, a unit increase in exposure to biology practicals in form four would result to significant increase in KNEC biology performance by 44.2%.

The first null hypothesis was rejected since students' exposure to biology practicals does not significantly affect performance in public secondary schools in Lugari Sub County, Kakamega County, Kenya. This confirmed the assertion of Rughnill,(2011) Alison, (2013) Alexander, (2016), Uche, (2018), that students exposed to Biology practical activities (experimentation) tend to learn more of what is taught, retain it longer, appear more satisfied with their practical work and perform better in examinations than when taught with other instructional formats. This is also in line with the empirical investigation reported by Nwagbo (2016), that students learn best when they are actively involved in the learning process.

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Intervening Role Laboratory presence on Exposure to Biology Practicals and Academic Performance

The study sought to establish the intervening effect of laboratory presence on the relationship between exposure to biology practicals and academic performance. This was achieved by conducting hierarchical linear regression to establish the R square, coefficient of determination as well as predicting biology performance from exposure to biology practical. The results are shown in table 4

Table 4: Controlling Effect of Laboratory presence on Exposure to Biology Practicals and Academic Performance

Model Summary									
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	.308[a]	.095	.082	.519727	.095	.308[a]	1	286	.002
2	.348[b]	.121	.105	.513124	.026	.348[b]	4	282	.000
a. Predictors: (Constant), KNEC_MEAN_SCORE									

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.773	.042		66.624	.000
	LAB	.156	.049	.184	3.167	.002
2	(Constant)	2.182	.121		18.084	.000
	LAB	.140	.049	.165	2.886	.004
	PE_FORM1	.725	.227	.288	3.188	.002
	PE_FORM2	.026	.183	.014	0.140	.888
	PE_FORM3	.544	.227	.233	2.396	.007
	PE_FORM4	.425	.262	.200	1.621	.106
a. Dependent Variable: KNEC_MEAN_SCORE						

PE-Practical Exposure

From the model summary in Table 4, the R square value of 0.121 showed that 12.1% of biology performance in secondary schools in Lugari sub county, Kakamega County could be explained by exposure to biology practicals after the intervention of laboratory. This is a significant improvement from 9.5% to 12.1% (2.6%) prior to intervening effect of laboratory. From the ANOVA results Table 4 in model one shows that there is a significant relationship between biology performance in secondary schools in Lugari sub county, Kakamega County and exposure to biology practicals (F=66.624, p-value <0.001). Further, From the ANOVA Table, both models were statistically significant for the data as the p value<0.001.This implies that laboratory presence plays significant intervening role on the relationship between exposure to biology practicals and performance. The second null hypothesis was rejected since presence of laboratory significantly intervene the effect of students' exposure to biology practicals on performance in public secondary schools in Lugari Sub County, Kakamega County, Kenya.

Moderating Effect of Number of Biology Teachers on Exposure to Biology Practicals and Academic Performance

The study sought to establish the moderating effect of number of teachers on the relationship between exposure to biology practicals and academic performance. This was achieved by conducting hierarchical linear regression to establish the R square, coefficient of determination as well as predicting biology performance from exposure to biology practical. The results are shown in table 5

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Table 5: Moderating Effect of Number of Biology Teachers on Exposure to Biology Practicals and Academic Performance

Model Summary									
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	.308[a]	.095	.082	.519727	.095	7.435	4	283	.000
2	.717[b]	.513	.505	.381805	.418	242.389	1	282	.000
3	.725[c]	.526	.511	.379563	.013	1.835	4	278	.022
a. Predictors: (Constant), KNEC_MEAN_SCORE									

Coefficients[a]					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.536	.161		9.527	.000
PE_FORM1	1.430	.472	.567	3.029	.003
PE_FORM2	-1.450	.474	-.761	-3.058	.002
PE_FORM3	.499	.511	.235	.977	.329
PE_FORM4	.354	.267	.195	1.326	.186
TOTALTR	.273	.049	1.014	5.527	.000
PE_FORM1*TR	.016	.155	.052	.105	.916
PE_FORM2*TR	.095	.071	.290	1.337	.182
PE_FORM3*TR	.331	.157	1.091	2.101	.037
PE_FORM4*TR	.342	.165	1.078	2.076	.039
a. Dependent Variable: KNEC_MEAN_SCORE					

PE-Practical Exposure

From the model summary in Table 4, the final R square value of 0.526 showed that 52.6% of biology performance in secondary schools in Lugari sub county, Kakamega County could be explained by exposure to biology practicals as results of moderating effects of number of teachers. This is a significant improvement from 9.5% to 52.6% prior to moderating effect of number of teachers. The third null hypothesis was rejected since number of biology teachers significantly moderates the effect of students' exposure to biology practicals on performance in public secondary schools in Lugari Sub County, Kakamega County, Kenya.

Clearly from Table 5, various deductions can be made; first, the form three practicals exposure interacting number of teachers (PE_FORM3*TR) coefficient is positive, meaning that the interactive effect is positive, therefore, as number of teachers increases by one percentage, the level of exposure to biology practicals in form three effect on performance significantly increases by 0.331 (P=0.037). Similarly, the form four practicals exposure interacting number of teachers (PE_FORM4*TR) coefficient is positive, meaning that the interactive effect is positive, therefore, as number of teachers increases by one percentage, the level of exposure to biology practicals in form four effect on performance significantly increases by 0.342 (P=0.039).

However, PE_FORM1*TR coefficient is positive but insignificant, meaning that as the number of teachers increases by one percentage, the level of exposure to biology practicals in form one effect on performance insignificantly increases by 0.016 (P=0.916). Similarly, PE_FORM2*TR coefficient is positive but insignificant, meaning that as the number of teachers increases by one percentage, the level of exposure to biology practicals in form two effect on performance insignificantly increases by 0.095 (P=0.182).

5. CONCLUSIONS AND RECOMMENDATION

From the result, it was found that student exposure to practical biology has a positive effect on performance of biology subject. However, currently, student exposure to biology practicals currently contributes up to 9.5% changes in biology performance. Exposure to biology practicals from form one to four significantly predicted performance of the subject in national examination with form one exposure having highest exposure, followed by form three, form four then form two. Presence of laboratory significantly improved the contribution of students' exposure to biology practicals from 9.5% to 12.1%. Further, the moderating effects of number of biology teachers strengthen the effect of students' exposure to biology practicals as the contribution moved from 9.5% to 52.6%. Increase in number of biology teachers had significant effect in form three and four. Therefore, the study concluded that students' exposure to biology practicals significantly affect performance in public secondary schools in Lugari Sub County, Kakamega County, Kenya, presence of laboratory significantly intervene the effect of students' exposure to biology practicals on performance in public secondary schools in Lugari Sub County, Kakamega County, Kenya and number of biology teachers does significantly moderates the effect of students' exposure to biology practicals on performance in public secondary schools in Lugari Sub County, Kakamega County, Kenya.

The study recommended that government should equip laboratories while principals should provide biology teachers with fund for consumables. The curriculum planners can moderate the time allocated to certain tasks. The government of Kenya (GoK) through Ministry of Education (MoE) and organizations like Japan International Corporation Agency (JICA) that sponsor projects such as Strengthening of Mathematics and Science in Secondary education (SMASSE) to continue organizing workshops, seminars and conferences for Biology teachers. The education stakeholders and QASO should monitor implementation of the education policy which lays emphasis on practical approach to teaching and learning of Biology. School administrators should endeavour to create a work strategy that will ease teacher workload to give them time for lesson preparation for practical activities. Experienced teachers should be used as resource for training other teachers. Finally, the Government, through the Teacher service commission should employ more biology teachers while Board of Management should employee more teachers to ease burden exerted on TSC teachers.

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