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Students' Academic Performance in STEM Subjects and Related Factors: A Case of a STEM Model Boys' School in Nandi County, Kenya

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ABSTRACT

This study aimed at establishing students' academic performance in Science, Technology, Engineering and Mathematics (STEM) subjects and Related Factors in a STEM-Model Boys' School in Nandi County, Kenya. The purpose of this study was to examine how students perform in internal examinations and during National examination, with more emphasis on STEM subjects (Mathematics, Chemistry, Biology and Physics). The objectives of the study were to establish: the extent of students' academic performance in a STEM-Model Boys' school in Nandi County, Kenya; the relationship between students' discipline and their academic performance; the relationship between students' performance in internal examination and their performance at National Examination and the relationship between students' performance in Kenya Certificate of Primary Education (KCPE) and their academic performance at Kenya Certificate of Secondary Education (KCSE) in a STEM-Model Boys' school in Nandi County, Kenya. This study was guided by Causal Comparative Ex-post Facto Research Design. The target population of the study was: 239 students who were at form four in 2020 academic year; the Director of Studies (DOS) and the Deputy Principal. A sample size of between 5 and 30 students was used, depending on the analysis that was done. The sample was obtained by use of simple random sampling technique. The DOS and the deputy principal automatically participated in the study. A questionnaire, an interview schedule and a document analysis schedule were used to collect data. Piloting of the instruments was done to validate them while test-retest method was used to test for the reliability of the research instruments. Data were analyzed using descriptive and inferential statistics. It was found out that the school averagely performs well as the mean-score of form 4 class was above 7.0 (KCSE 2020) and that no A (plain) grade has been achieved for over five years. Quality grades are yet to be achieved as the school had the leading student with grade A- (minus), with average grades in STEM subjects. Majority of the students scored between grades C+ (plus) and D+ (plus) in examinations. Students' performance in STEM subjects are below a mean of 6.0 and this indicate that most learners are not able to secure STEM careers at post-secondary levels of education. From the hypotheses tested, it was established that students' discipline also goes proportionally with academic performance; a linear relationship was found to exist between students' performance in internal examinations and their performance at KCSE; students' performance at KCPE and KCSE were found to have an inverse relationship where it was established that a student who scores high at KCPE tends to relax at high school and scores low at KCSE. The findings of this study will inform the Center for Mathematics, Science, and Technology Education in Africa (CEMASTEA) and Ministry of Education (MoE) on the extent of performance of STEM-model schools in Kenya. Teachers and students too will get informed on their performance and have a projection to careers.

Keywords: Performance, Discipline, Relationship and Subjects

GEOGRAPHICAL AREA OF THE STUDY

This study sought to examine Students' Performance in STEM Subjects and Related Factors in a STEM-Model Boys' School in Nandi County, Kenya. Nandi County has six Sub Counties and is surrounded by the Nandi Escarpments. It is bordered by Uasin Gishu County form the North and East, Kakamega County from the West and Kisumu County from the South

1. INTRODUCTION

STEM Education and Students' Academic Performance

STEM is an acronym that stands for science, technology, engineering, and mathematics. A total of 47 Extra-County schools, one per County were chosen in 2016 by the Ministry of Education as STEM-model schools. The second school was chosen in 2017. These schools were chosen based on enrollment, past performance in Mathematics, Biology, Chemistry and Physics (STEM subjects) among other factors. STEM model schools motivate and inspire students to excel in

STEM subjects and pursue STEM related courses in their future careers. These courses will help address the existing need for workers in STEM related careers (CEMASTEA, 2017). The new education curriculum also proposes STEM as one of the pathways for learners. Therefore there is need for teachers and other educators to build capacity on interdisciplinary approach to instruction in STEM both for existing curriculum and the reformed curriculum. STEM subjects (Mathematics, Physics, Chemistry and Biology) should be taught as one as a multidisciplinary approach where the teacher in each of the four subjects should bring the skills of the other three subjects in explaining phenomena.

Students' Discipline and Academic Performance

Researchers appreciate that discipline is an important component of human behavior and assert that without it an organization

cannot function well towards the achievement of its goals (Ouma, Simatwa, & Serem, 2013). In the context of a school system, a disciplined student is that student whose behaviours, actions and inactions conform to the predetermined rules and regulations of the school (Ali, Dada, Isiaka, & Salmon, 2014). However, discipline ideally means more than adhering to rules and regulations and entails the learner's ability to discern what is right or wrong (Gitome, Katola, & Nyabwari, 2013). Discipline is widely acknowledged to be essential for creating a positive school climate conducive to sound academic performance (Masitsa, 2008). It is a basic requirement for successful teaching and learning in schools and a subject of concern for teachers (Eshetu, 2014).

Secondary School Examinations

Kenya has official national examinations conducted by the Kenya National examination Council (KNEC): an official examination body appointed by an act of parliament. The Kenya National Examination Council conducts several summative examinations mainly for grading purposes. Kenya Certificate of Primary Education (KCPE) examinations are done at class eight and the results are used to place learners to different secondary schools. Similarly, Kenya Certificate of Secondary Education (KCSE) examinations are done at the end of form 4 of every year and the results are used to determine the candidate's next level in the education hierarchy including the intake to foreign Universities. The Universities of high repute in Kenya and abroad are competitive and only take the best in terms of performance for the most preferred courses. This brings about a lot of competition in terms of course selection and act as a bottleneck of going to the next level of education.

Statement of the Problem

Performance of students in National examinations in STEM subjects (Mathematics, Physics, Chemistry and Biology) in several secondary schools nationally has been low, as noted from the Kenya National examinations council (KNEC) yearly reports. For example the national mean scores for Chemistry between 2016 and 2019 were: 20.71% (2019), 24.05% (2018), 26.90% (2017) and 26.10% (2016). Based on the above statistics, most learners could not pursue STEM related careers because of low performance in Chemistry, which cuts across most careers. This indicates that we shall have few engineers, doctors, nurses, among other professionals in the Nation in the near future and may compromise the achievement of the realization of the Big Four Agenda and Vision 2030 at large.

In their article titled "why is STEM Education important in South Africa?'', White & David (2014) observed that STEM Education uniquely provides students with a space to develop their problem solving and critical thinking skills. They also indicate that students have a growing advantage in the workforce as they learn STEM, with the advantage increasing from primary school to high school to post-secondary. Okoth, Ogeta, Otieno and Orodho (2018) conducted a study on the Influence of Resources on Students' Academic Performance in Physics at Secondary Schools in Ugenya Sub-County, Siaya County, Kenya. The findings of this study indicated that inadequate instructional resources and trained teachers of physics have a profound effect on students' performance in science subjects, especially in Physics.

The researchers in the above studies have done studies on the significance of STEM education, teaching/learning resources and teaching methods in Science subjects and their influence on students' academic performance. The current study aimed at examining students' academic performance in STEM Subjects and Related Factors in a STEM Model Boys' School in Nandi County, Kenya, with emphasis on the effects of students' discipline on students' academic performance and also the relationship between students' performance in internal examination, performance at KCPE and performance at KCSE.

Objectives of the Study

The objectives of the study were to examine:

1. The extent of students' academic performance in a STEM-Model Boys' school in Nandi County, Kenya.
2. The relationship between students' discipline and their academic performance in a STEM –Model Boys' school in Nandi County, Kenya.
3. The relationship between students' performance in internal examination and their performance at National Examination in a STEM-Model Boys' school in Nandi County, Kenya.
4. The relationship between students' performance in KCPE and their academic performance at KCSE in a STEM-Model Boys' school in Nandi County, Kenya

Research Questions

The following questions guided the research:

1. What is the extent of students' academic performance in a STEM-Model Boys' school in Nandi County, Kenya?
2. What is the relationship between students' discipline and their academic performance in a STEM –Model Boys' school in Nandi County, Kenya?
3. What is relationship between students' performance in internal examination and their performance at National Examination in a STEM-Model Boys' school in Nandi County, Kenya?
4. What is the relationship between students' performance in KCPE and their academic performance at KCSE in a STEM-Model Boys' school in Nandi County, Kenya?

Research Hypotheses

1. There is a relationship between students' discipline and their academic performance in a STEM –Model Boys' school in Nandi County, Kenya.
2. There is a relationship between students' performance in internal examination and their performance at National Examination in a STEM-Model Boys' school in Nandi County, Kenya.
3. There is a relationship between students' performance in KCPE and their academic performance at KCSE in a STEM-Model Boys' school in Nandi County, Kenya.

2. LITERATURE REVIEW

The rapid proliferation of social media has transformed political

Students' academic performance in STEM subjects

Students' achievement has always been a concern of Malaysian government. When Malaysia first participated in Trends in International Mathematics and Science Study (TIMSS) in 1999, the average score of students was higher than the international one in both mathematics and science. The 2011 TIMSS showed no improvement of the Malaysia's ranking and average scores in mathematics and science. The Malaysia's TIMSS ranking in mathematics fell from 20th in 2007 to 26th in 2011 while science ranking from 21st in 2007 to 32nd in 2011 (Mullis, Martin, Foy, & Arora, 2012).

According to the Nigeria Institute of Physics (NIP) (2014), the average performance for Physics and Chemistry from 1999 to 2011 was 44 .71% and 42.33% respectively. The average performance of Physics and Chemistry were depreciating (Nigerian Institute of Physic, 2014). Further, Chemistry was identified to be one of the major bedrock for transformation of the national economy, and hence must be accorded adequate attention.

Manoah, Indoshi and Othuon (2011) conducted a study on the influence of attitude on performance of students in mathematics programme in public secondary schools in Kisumu East District, Kenya. The findings established that attitude played an essential role in the performance of students'. Students with positive attitude tended to perform well in an examination.

Relationship between students' discipline and their academic performance

Existing literature reveals that student indiscipline is experienced in schools globally. A study in West Virginia in the United States of America (USA) revealed that about 29.6% of 160,480 students (from grade 3 to 11) had one or more referrals for inappropriate behaviors (Whisman & Hammer, 2014).

In Africa, researchers have pointed out the seriousness of indiscipline in schools in various countries. Umezinwa and Elendu (2013) for instance, observed that indiscipline among learners in Nigeria was high and experienced at all levels including primary schools.

In Kenya, lack of discipline in schools has been one of the challenges facing schools (Njoroge & Nyabuto , 2014). In a study by Gakure, Mukuria, and Kithae (2013) in primary schools in Gatanga District, Kenya, 70% of selected 56 teachers indicated that their schools had cases of pupil indiscipline. Njoroge (2014) too conducted a study on Discipline as a Factor in academic performance in Kenya. The research findings found out that students are experiencing poor achievements in mathematics despite the subject being considered as fundamental in turning around Kenya's industrialization by 2030. The study further established that discipline is essential for good learning in schools and hence good academic performance.

Relationship between students' performance in KCPE and their academic performance Maitha (2013) conducted a study titled "Assessment of the extent to which Kenya Certificate of Primary Education performance predicts performance at Kenya Certificate of Secondary Education in Kajiado Central Constituency, Kenya". The study found out that there was a fairly weak correlation between KCPE and KCSE performance. He further noted that KCPE overall performance as an independent variable accounted for 21.1% of the KCSE performance as an outcome of depended variable. School based factors such as teaching methodologies, skills and abilities tested accounted for 79.9% of the relationship.

Relationship between students' performance in internal examinations and performance at National Examinations

A predictive study was carried out by (Yimer, 1991). It looked at High school performance as a good predictor of college performance. The study compared the predictive powers of the Ethiopian School Leaving Certificate Examination (ESLCE) with other measures (Freshman English, Freshman Mathematics and GFA grades). He used a sample of 1720 regular first year students at the University. The resultant correlations were all found to be significant and thus the measures were good predictors of freshman grades.

Ng'ang'a (1995) investigated the relationship between form four teacher made tests and KCSE examination in Kenya. She used test scores in school examinations (End of Term one and Mock examination) and KCSE examination. She established that correlations obtained between first term examinations and Mock examinations were not all statistically significant. Some were high, others substantially lower and for some (Mathematics, Biology and physical science) negligible. Again, she found out that first term examination was not well related with KCSE examinations.

Significance of the Study

The findings of this study shall inform CEMASTEA and MoE on the extent of performance of STEM-model schools in Kenya. Teachers too will benefit from the study findings on extent of performance of students academically, with emphasis on STEM subjects. All stakeholders (Board of management, parents' association, principals, teachers, students, parents and the essential staff) will gain a lot of information from the study findings on the relationships between: students' discipline; fees payment rate; internal examinations and students' academic performance.

Theoretical Framework

Social learning theories of John Dewey (2016), Zoltan Dienes (1916), and Richard Lesh (1985) guided this study. These theorists have influenced STEM classrooms for a long time. Zoltan Dienes observe that using manipulative materials, games, stories, songs in learning mathematics makes it more fun. Lesh (1985) is the originator of teaching models and modeling perspectives designed to help reveal thinking processes to students and teachers. According to Glancy, Aran W. and Moore, Tamara J. (2013), "Experiential education, concrete manipulatives and multiple representations are just some of the lasting ideas taken in part from these theorists that remain important components of current educational practice". Teachers of STEM subjects should therefore use the ideas of these theorists in different ways. Glancy (2013) further observe that "*As integrated approaches to science, technology, engineering, and mathematics (STEM) become more common, the need to develop effective strategies in these cross-disciplinary environments becomes more urgent*".

According to Moore, Roehrig, Lesh, and Guzey (2010), "*In order to prepare students to address the problems of our society, it is necessary to provide students with opportunities to understand the problems through rich, engaging, and powerful experiences that integrate the disciplines of STEM*", which are the ideas from social learning theories.

Lesh and Dewey agree that students' problems in schools should be grounded in the real world, but all they believed students should work collaboratively (Glancy et. al, 2013). These two theorists have different views. For Dewey (1916, 1938) education was both social in nature and served a function within a democracy, thus students should act and be treated like members of a community with all the freedoms of the members of a democratic society. The pursuits Dewey envisioned for his students were community pursuits, requiring the students to work together as a community of learners (Glancy et. al, 2013). According to Lesh (1985), realistic, interdisciplinary problems outside school are usually tackled by teams, often where members have different areas of expertise. Because of this, it is logical for students to also approach their problems in teams. Students also share experiences in teams rather than individual basis. Discipline is an independent factor that hinders students' performance and hence as students interact, their discipline levels should be monitored.

3. METHODOLOGY

This study employed Causal comparative Ex-post Facto design was used to conduct the study. This design was appropriate for this study since past records about the 2020 form four class were examined.

Target Population

The target population of the study was 239 form four candidates of 2020 academic year, one director of studies (DOS) and one deputy principal. The total population was therefore 241 people. These respondents possessed the information of interest by the researcher hence were targeted.

Sample Size and Sampling Approach

Data for all the 239 candidates of 2020 class was examined. Depending on the nature of analysis done, simple random sampling technique was used to obtain the required sample size, ranging for 5 students to 30 students. The deputy principal and DOS also participated in the study, giving a total sample size of 32 respondents.

Research Instruments

A document analysis schedule was used to collect data where term 2, 2020 end of term examination and 2020 KCSE examination results were analyzed. Students' KCPE scores were also obtained. These results were obtained from the director of studies. An interview schedule was also used to collect information from the deputy principal on discipline matters of the 2020 form 4 classes.

Validity And Reliability of the Instruments

A research expert was requested to validate the data collection instruments where they examine the face and content validity of the instruments. Piloting of the instruments was also done. Amendments were done on the research instruments based on the expert opinions. Test-retest method was used to test for the reliability of the interview schedule. A coefficient of 0.78 was obtained and hence acceptable according to Madan & Kensinger, (2017), who observe that a coefficient of at-least 0.7 is acceptable.

Data Collection Procedure

Permission was sought from the school administration to use examination records in the research and also interview the deputy principal. Print out of the results was obtained from the director of studies. The deputy principal was also interviewed on discipline matters.

Data Analysis Procedure

Data was analyzed using descriptive and inferential statistics. Frequencies and percentages were calculated while simple linear regression and correlation were used to test the hypotheses. Data were then presented using tables.

Ethical Consideration

Informed consent was ensured among the respondents. They were informed about the purpose and benefits of the research and were requested to participate in the study. They were assured that the information they gave will be treated with confidentiality. The respondents too remained anonymous right from the time of data collection, analysis, interpretation and report writing.

Data Analysis, Presentation And Discussion Of The Findings

The objectives of the study were to establish:

The extent of students' academic performance in a STEM-Model Boys' school in Nandi County, Kenya.

The relationship between students' discipline and their academic performance in a STEM –Model Boys' school in Nandi County, Kenya.

The relationship between students' performance in internal examination and their performance at National Examination in a STEM-Model Boys' school in Nandi County, Kenya.

The relationship between students' performance in KCPE and their academic performance at KCSE in a STEM-Model Boys' school in Nandi County, Kenya

Extent of students' academic performance in a STEM-Model Boys' school in Nandi County, Kenya

This study sought to establish the extent of extent of students' academic performance in a STEM-Model Boys' school in Nandi County, Kenya. A total of 239 students sat for Kenya Certificate of Secondary Education (KCSE) in 2020. From the document analysis done, it was established that the school KCSE mean-score dropped slightly from 7.148 (2019) to 7.017 (2020), a negative deviation of -0.131. It was further established that no student scored grade A and hence the school lacked quality grades. Four A (minuses) were scored in KCSE 2020. Majority of the students (182- 76.2% and 154- 64.4%) were found to have scored between grades C+ and D+ in end of term two examination and KCSE of 2020 respectively. A total of 149 students (62.3 %) secured direct admissions to University as they achieved the minimum university entry requirement of grade C+. The others were able to secure chances at the middle level colleges to study STEM related careers, among other courses.

Students' performance in STEM subjects during KCSE of 2020

Table 1 below shows how the 2020 candidates performed in STEM subjects

Table 1: Students' performance in Mathematics, Chemistry, Biology and Physics

Subject	Mean score
Mathematics	5.77
Chemistry	4.699
Biology	5.03
Physics	5.32

It is evident from table 1 that the mean scores for all STEM subjects were below the school mean of 7.017. This implies that though 62.3 % of the candidates secured direct university admissions, they may not be able to have secured STEM careers due to low performance in STEM subjects.

Relationship between students' discipline and their academic performance in a STEM –Model Boys' school in Nandi County, Kenya

Discipline records were examined from the deputy principal and were compared with learners' academic performance. Table 2 below shows the number of discipline levels per stream and their respective mean scores.

Table 2: A comparison between number of indiscipline cases among students per stream and stream mean scores

Stream	Number of indiscipline cases	Stream mean-score
4N	5	7.16
4S	12	7.1
4W	13	7.09
4E	23	6.71

Table 2 indicates that the class with the smallest number of indiscipline cases has a higher academic performance and the class with a higher number of indiscipline issues has a lower academic performance. This shows that the discipline level of a class goes hand in hand with academic performance. Form 4N had the lowest number of indiscipline cases (5) and led academically (mean of 7.16) as compared to form 4E which had the highest number of indiscipline cases (23) and scored the lowest at KCSE (mean of 6.71).

A hypothesis was tested to further examine the relationship between indiscipline and academic performance. The above data in table 2 was also used where a correlation was established between indiscipline and students' academic performance.

Pearson's product moment correlation coefficient was computed using SPSS software and a correlation coefficient of -0.233 was obtained. According to Ogula (2010), this indicates that a low negative correlation exists between students discipline level and academic performance, implying statistically that a small negative relationship exist between students' discipline and their academic performance. It therefore means that as the number of indiscipline cases rises in a class, the class-mean score consequently drops and the vice-versa. This finding agree with that of West Virginia in the United States of America (USA) which revealed that about 29.6% of 160,480 students (from grade 3 to 11) had one or more referrals for inappropriate

behaviors (Whisman & Hammer, 2014). This study concluded that discipline is essential for good learning in schools and hence good academic performance. Similarly, in Kenya, it was found out that lack of discipline in schools has been one of the challenges facing schools (Njoroge & Nyabuto , 2014).

Relationship between students' performance in internal examination and their performance at National Examination (KCSE) in a STEM-Model Boys' school in Nandi County, Kenya.

To examine the relationship between students' performance in internal examination and their performance at the Kenya Certificate of Secondary Examination (KCSE), data was obtained from end of term two internal examination and KCSE performance of 2020. A sample of five boys was used and table 3 below shows the results.

Table 3: Students' academic results for end of Term 2 examination and performance at KCSE 2020

Student	Mean-score in end of term 2 exam (X)	KCSE mean-score (Y)
1	8.5	10.0
2	7.1	7.0
3	5.9	7.0
4	4.6	6.0
5	3.4	5.0

Simple linear regression analysis was done to obtain a model relating students' performance in end of term 2 Examination and their KCSE performance. The linear equation obtained was $Y = 1.846 + 0.8736X$, where X is students' performance in end of term 2 exam while Y is their KCSE performance. This model applies to majority of the students as they share similar characteristics like form one entry mark. This linear model therefore when used to relate the mean-score for end of term 2 examination of 2020 and KCSE mean-score, a true relationship is noted. It predicts too what STEM subjects were to get at KCSE and also what the school mean-score was going to be in 2020.

The same model can therefore be used in 2021 to predict the KCSE mean score (after end of term two exams of 2021) for the school under an assumption that the 2021 candidates have a similar academic behavior with 2020 candidates, as measured using KCPE marks and that they are using similar resources and academic programmes, just like 2020. This model of $Y = 1.846 + 0.8736X$ is therefore recommended for the school to use and predict the KCSE 2021 mean-score using end of term 2 results of 2021. STEM subject mean-scores can also be obtained.

The above findings support that of Ng'ang'a (1995) who investigated the relationship between form four teacher made tests and KCSE examination in Kenya. She used test scores in school examinations (End of Term one and Mock examination) and KCSE examination. She established that correlations obtained between first term examinations and Mock examinations were not all statistically significant. Some were high, others substantially lower and for some (Mathematics, Biology and physical science) were negligible. She also found out that first term examination was not well related with KCSE examinations.

Relationship between students' performance in KCPE and their academic performance at KCSE in a STEM-Model Boys' school in Nandi County, Kenya

Relationship between students' performance in KCPE and their academic performance at KCSE was examined by obtained KCPE marks and the corresponding KCSE marks for five students selected by simple random sampling technique. Table 4 below shows the summary of the findings.

Table 4: Students' performance at KCPE and KCSE of 2020 class

Student	KCPE marks	KCPE Mean-score (X)	KCSE mean-score (Y)
1	353	10.0	6.0
2	350	10.0	7.0
3	377	11.0	6.0
4	322	9.0	7.0
5	325	9.0	5.0

It is evident from table 4 that all the five students randomly selected scored below their KCPE mean scores during KCSE. From the statistics in table 4 above, it indicates that generally a student who scored high at KCPE deviates more negatively at KCSE, or in other words, he scores low at KCSE. For example a student who got 377 marks (mean of 11.0) at KCPE exited with a mean-score of 6.0 points at KCSE. He lost value by almost half. The reason behind this might be that such a student who scores high at KCPE tend to come and relax in high school.

Similarly, a student who scores low at KCPE will come and work hard and performs better at KCSE. This is evident from table 4 that a student who scored 322 marks (9.0) at KCPE, and scores a mean-score of 7.00 at KCSE, performing higher than that of 11.0 at KCPE dropping to 6.0 at KCSE.

The above statistics were further analyzed by computing a correlation coefficient between KCPE scores for the five students and their corresponding KCSE scores. Spearmann's rank correlation coefficient was calculated and found to be 0.075. According to Mugenda (2003), this indicates a very weak positive relationship, connecting KCPE scores and KCSE scores. This supports the discussions made earlier that a student who scores higher at KCPE tends to score lower at KCSE, in other words such a student is not maintaining his "*academic value*" while at high school. This finding also agree with that of Maitha (2013) conducted a study titled "Assessment of the extent to which Kenya Certificate of Primary Education performance predicts performance at Kenya Certificate of Secondary Education in Kajiado Central Constituency, Kenya". The study found out that there was a fairly weak correlation between KCPE and KCSE performance. He further noted that KCPE overall performance as an independent variable accounted for 21.1% of the KCSE performance as an outcome of depended variable and that school based factors such as teaching methodologies, skills and abilities tested accounted for 79.9% of the relationship.

4. FINDINGS

From the study findings, the school averagely performs well as the 2020 KCSE mean-score of form 4 class was above 7.0. Quality grades are yet to be achieved as the school has been having the leading student with grade A-(minus). No A (plain) grade has been achieved for the last five years. Majority of the students scored between grades C+ (plus) and D+ (plus). Students' performance in STEM subjects(Mathematics, Chemistry, Biology and Physics) are below a mean of 6.0 and this indicate that most learners are not able to secure STEM careers at post-secondary levels of education. This also implies that the future of the Country is not safe in terms of achievement

of the Big Four Agenda and realization of Vision 2030, as they rely on STEM subjects which are underscored by learners.

Students' discipline also goes proportionally with academic performance. A discipline student will score well in academics as compared to an indiscipline student. This was noted to be the case as form 4 class with the highest indiscipline cases scored the lowest mean score and that class with minimal indiscipline cases led academically.

A linear relationship exists between students' performance in internal examinations and their performance at KCSE. A model was consequently developed to predict the academic performance of students at KCSE using end of term two examinations. The model is suggested to be true also for the 2021 candidates since they share most aspects in common with the 2020 candidate class (the entry mark at form one and the interventions they received while at school).

Students' performance at KCPE and KCSE were found to have an inverse relationship. It was established that a student who scores high at KCPE tends to relax at High school and score low at KCSE. Similarly, that student who scores low at KCPE tends to work harder at High school and finally scores well at KCSE.

Recommendations, Based on the Findings

From the study findings, it is recommended as follows;

a) Teachers should spend adequate time and encourage learners to balance the performance in subjects in exams. Efforts to improve in STEM subjects among students should be initiated.
b) Discipline management should be strengthened in schools for learner academic performance to improve.
c) Internal examinations in schools should be used by teachers to make predictions in future examinations.
d) This makes teachers to address students' weaknesses early and attend to them for better results.
e) Teachers should encourage students to maintain the KCPE mark at school, at all times. They should score higher than their KCPE mark in any examination.

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