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Original Article

Investigating the Effect of Principals' Allocation of Teaching and Learning Resources on Learners' Academic Performance: Insights from Kenya Certificate of Secondary Education

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Abstract: This study investigates the impact of principals' allocation of teaching and learning resources on academic performance in the Kenya Certificate of Secondary Education (K.C.S.E.) in public schools. Grounded in Von Bertalanffy's General Systems Theory, this study employed a mixed-method explanatory sequential design, prioritizing quantitative methods followed by qualitative methods. The target population comprised 4,691 participants: 340 principals, 1,360 heads of departments (H.O.Ds), and 2,991 teachers. A sample of 451 respondents was selected using proportionate stratified random sampling for 85 schools, 114 H.O.Ds and 252 teachers, with census sampling for national and special schools and purposive sampling for 85 principals. Data were collected through questionnaires and interview guides, ensuring content, criterion, construct, and face validity via expert evaluation and reliability through Cronbach's alpha (≥0.7). Quantitative data were analyzed using SPSS-29, while qualitative data were subjected to thematic analysis and integration with phase one findings. Descriptive statistics are presented in tables and graphs, as well as inferential statistics, including Pearson's correlation coefficients, ANOVA, and regression coefficients. The results reveal a moderately positive relationship ($r=0.072$, $p\leq0.05$) between resource allocation and K.C.S.E. performance, thus supporting the hypothesis that resources are inadequate. The principal identified inadequate funding as a significant issue. The findings aim to inform corrective actions for poor academic performance, and further research on principals' leadership skills and their impact on K.C.S.E. performance is recommended.

Keywords: Principals' leadership practices; Allocation; Teaching and learning resources; Academic performance, Kenya

1. Introduction

Research suggests that the attainment of Sustainable Development Goal Four (S.D.G 4) would be facilitated by complementing increased access with the utilization of educational infrastructures and information communication technology to enhance the quality of learning outcomes (UNESCO, 2015). Principals perform activities that form a dynamic interrelationship among the school structures and stakeholders thereby depict the interconnectedness

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between them and a possible dependence of academic performance on them (Greatbatch and Tate, 2018). It is the argument of Vanblaere and Devos (2017) that the principal should provide instructional directions that would influence the teachers to show collective responsibility and practice reflective dialogue before, during and after presenting lessons to the learners to enable them to achieve higher academic grades. The key role of the principals is to provide direction, resources and support to teachers and students in order to enhance high quality teaching and learning outcomes (Stosich and Bristol, 2018). Therefore, leadership practices should focus on individual components of the instructional programs and other elements in the school that may influence classroom instruction and how such programs may also influence other factors in the school (Wallace Foundation, 2013) to result in the intended learning outcomes. Similarly, Kenya Vision 2030 underscores the importance of education in ensuring relevant human and social capital for sustainable development (Republic of Kenya, 2019a). A glimpse of national trends of students' performance in Kenya Certificate of Secondary Education (K.C.S.E.) from 2018 to 2022 is shown in Table 1.

Table 1. National Analysis of K.C.S.E. Performance from 2018 to 2022

Year	2018	2019	2020	2021	2022	Average
Mean score	3.927	4.467	4.503	4.201	4.469	4.313
Grade	D	D+	D+	D +	D+	D+

Source: Adopted from Kenya National Examination Council (2023).

Table 2 indicates that nationally, there was fluctuating candidates' performances during 2018 to 2022 with the national average K.C.S.E performance within the five-year period standing at 4.313 which is a mean grade of D+. The low performance would not enable the exiting learners to compete favourably in nationally and internationally in both education and employment arena where high quality academic grades are demanded for employment and continued education (UNESCO, 2017a). On the other hand, an improvement in academic performance may lead to increased future income to individuals and to the nation (Hanushek, 2011). Table 2 highlights the learners' performance in K.C.S.E in all the Counties in Nyanza Region from 2018 to 2022.

Table 2. Learners' Performance in K.C.S.E in Nyanza Region from 2018-2022.

County	Mean Score						
	2018	2019	2020	2021	2022	Average	Grade
Siaya	4.470	4.800	4.120	4.580	4.915	4.577	D+
Nyamira	3.580	4.340	4.740	5.190	4.999	4.569	D+
Migori	4.100	4.140	4.140	5.350	4.981	4.542	D+
Kisumu	4.160	4.490	4.700	4.330	4.823	4.500	D+
Homa Bay	3.690	4.680	4.760	4.980	4.343	4.491	D+
Kisii	3.340	3.560	3.980	4.710	4.770	4.072	D+
Nyanza	**3.890**	**4.330**	**4.410**	**4.860**	**4.810**	**4.460**	**D+**

Source: Siaya County Education Office (20220

Table 3 indicates that performance in K.C.S.E across six Counties resembles the national trend with learning outcomes averaging a mean grade of D+ during the five-year period. Comparatively Kisii County like other Counties posts a fluctuating mean score and has the lowest average mean of 4.072 (D+) and far much lower than the national average of 4.313 (D+). It may also suggest that many the candidates obtained grades D+ and below, which almost disqualifies them from pursuing any professional course (Republic of Kenya, 2018a). The Teachers' Service Commission substantively appoints Principals to provide satisfactory quality leadership in public secondary schools in Kenya alongside introduction of performance contracting (P.C) for the principals and teacher performance appraisal and development (T.P.A.D) for all teachers (RoK, 2015) with a view to improve on the quality of learning outcomes. Despite this arrangement, there has been persistent low academic performance in K.C.S.E. in Kenya and the study locale. The low educational achievement suggests a lasting negative impact on individual lives and represents lost output for the national economy (Michelmore and Dynarski, 2016) due to a reduced technical skilled human capital and increased low level of productivity.

In the context of this study, it may suggest that learners exiting secondary school education might not be competitively absorbed in training institutions to acquire relevant knowledge and skills for their individual and national development (Hanushek, 2011). The government has prevailed upon education stakeholders to address the worrying trend of low academic performance (Republic of Kenya, 2019). Therefore, the researcher investigated the influence of principals' leadership practices on academic performance in K.C.S.E in public schools in Kisii County to shed light on the persistent low average academic performance. The purpose of this study was to investigate the influence of

principals' allocation of teaching and learning resources on learners' academic performance in Kenya Certificate of Secondary Education (K.C.S.E.) in public schools in Kisii County.

2. Literature Review

2.1. Staffing of Subjects and Learners' Academic Performance in K.C.S.E.

Feng and Sass (2018) study in U.S.A. determined the efficacy of non-wage compensation scheme of Florida's Critical Teacher Shortage Program (F.C.T.S.P.) on teacher retention. The study focused on loan forgiveness component and the one-time retention bonus of up to $1,200. The results of the study suggested that both loan forgiveness and short-term bonuses had substantial contribution in teacher retention among Mathematics, Science and Special Education. Specifically, there were a 10.4%, 8.9% and 32.2% in teacher retention for Mathematics, Science and Special Education respectively. Above all, the teachers who benefited from the two programs had a noticeable improvement in their job performance than those teachers who were ineligible. The reviewed study addressed teacher shortage mitigation measure via financial incentives that were offered through a government initiative in U.S.A., the current study explored how the principals approach staffing issues in their schools to the level of influencing learners' academic performance.

Ayeni and Amanekwe (2018) study in Nigeria investigated the impact of teachers' instructional workload management on students' academic performance. It was a descriptive survey that used stratified random sampling technique to sample 12 schools, 12 principals and 120 teachers. The results of the study demonstrated that there was a negative correlation between teachers' workload and students' academic performance (r-cal=-0.420). The result indicated that teachers are overwhelmed with excess workload to the extent that they are unable to perform their core instructional duties, and this contributes to low students' academic achievement. The forgoing study dwelled on public and private secondary schools in Nigeria while this study was done in public secondary schools in Kenya because they are more directly influenced by the instructional policies from the national government than private schools.

Moreover, other studies in Kenyan context have found a considerable link between staffing and learners' academic achievement. For instance, Okemwa and Mudulia (2019) study which applied mixed method research design in Masaba South Sub- County revealed that teachers were inadequate making 12.5% of classes to go untaught and about 50% of the schools used volunteer teachers some of whom were unqualified to teach. These resulted into poor academic performance in K.C.S.E in the study locale. Similarly, Adika and Sika (2019) study in Suba Sub- County identified that teachers' workload significantly positively influenced academic performance ($r = .523$, $N=154$, $p<0.01$) and that for every one unit of increase in teacher's workload, there was a decrease in academic performance at a coefficient (-.558). The reviewed studies did not consider other contextual factors such as school type and principals having been trained in school leadership before appointment that might contribute to academic performance. The current study considered the named factors to fill the gap. However, their findings have been confirmed by recent studies including Ireri et al., (2023) study whose sample size was 71 participants established that there was understaffing among the national schools in Kenya with staffing being statistically significantly correlated to academic performance (r=.372, p-value =0.05) and Likoko et al.,(2023) study in Trans Nzoia County whose sample size was 262 participants revealed that staffing status significantly influenced academic performance ($\beta=0.644$, p-value=0.000<0.05).

Besides, improper staffing practices such as unclear transfer procedures by the Teachers' Service Commission (Wanjala, 2019) have been noted by research to lower teachers' morale in teaching in primary schools of Merti Sub-County and academic performance in K.C.S.E. in Kakamega County (Angote et al., 2023). Whereas the reviewed studies have made contributions in the body of knowledge, in the context of the current study, the studies of Ireri et al., (2023) and Likoko et al., (2023) had very small samples which rendered them to lack external validity, the current study applied a larger sample size to fill this gap while Wanjala (2019) study was done in primary school set up whose curriculum and other school internal factors defer to a large extent with those of secondary school level where the current study was based and Angote et al., (2023) study dwelt on the perception of teachers towards their transfer on academic performance thus failed to show clearly the association between transfers and academic performance.

2.2. Allocation of Information Communication Technologies and Learners' Academic Performance in K.C.S.E.

Wright and Reeves (2019) study in U.S.A examined the perspectives of institutional stakeholders at a state college in Florida on adoption of Open Educational Resources (O.E.R.). It had a sample size of 176 participants. Results of the study revealed that even though O.E.Rs has challenges such as time consuming, difficulty in getting links to get materials and acquiring license to use them, they are generally affordable, allow for creativity and flexibility, cost effective, accurate, make students fully engaged in, and enjoy their learning. The reviewed study dwelt on the perspectives of institutional stakeholders on the use of OERs in teaching and learning, the current study filled the gap by exploring the influence of ICT on learners' academic performance. Similarly, impact of I.C.T. on academic performance have been confirmed to be significant by Park and Weng (2020) among the OECD countries.

According to Kasujja and Baluku (2020) study in Uganda that investigated ICT usage in teaching and its influence on students' academic performance in Uganda Certificate of Education (UCE) in Kasese District, Uganda. The study used cross-section research design to collect data and chi-square to analyse quantitative data. There were 291 respondents for the study. The study revealed that accessibility and utilization of the ICT had positive and significant influence on students' academic performance in U.C.E. Further, using the nominal-by-nominal contingency coefficient of 0.149 at significance level of 0.030(Sig<0.05), the study concluded that 14.9% of the students' academic performance in U.C.E. could be attributed to the accessibility of ICT in the schools during teaching and learning. However, the study of Mugizi and Amwine (2020) in a private school context of Uganda found a positive but insignificant influence between application of ICT in collaborative teaching and learning and teachers' job performance. The study recommended for more ICT facilities to be allocated to the teachers as opposed to school administration. The study of Kasujja and Baluka (2020) applied cross-sectional survey to study the influence of use of ICT on students' academic performance, the current study applied explanatory sequential design while that of Mugizi and Amwine (2020) was done in a private school. Therefore, its results may not be universally applied in public schools as is the case of the current study.

Kipkoech and Mbugua (2019) study in Kenya investigated the cause of lack of improvement in academic performance in secondary schools in Taita- Taveta County, despite the implementation of I.C.T projects. The result indicated that there was a positive and statistically significant association between ICT infrastructure and academic performance among the secondary schools in Taita-Taveta County at p = 0.047 tested at 0.05 level of significance. It recommended that more ICT infrastructure should be distributed to the schools and intense training of teachers, school administrators and students should be rolled out to allow the school stakeholders to be conversant with the ICT skills to enable for their beneficial use in the schools. The reviewed study majored on investigating the cause of lack of improvement in academic performance yet there is I.C.T project in secondary schools. The current study explored influence of allocation of teaching and learning resources on learners' academic performance in Kenya. Moreover, Kimuya et al., (2021) cross –sectional survey in Nairobi County found out that there was a statistically significant association between teachers' perception of principals' enhancement of ICT in teaching and learning strategy and academic performance. However, Okemwa et al., (2020) which studied influence of B.O.M infrastructural development practices on academic performance in Nyamira County revealed that 60.2% of the students highlighted that there were no computer laboratories in their schools and this occurrence negatively affected academic performance.

2.3. Allocation of Science Laboratories And Learners' Academic Performance in K.C.S.E.

In U.S.A. Smith, et al., (2020) investigated the difference of teaching Physics' experimental skills and Physics' content on students' examination performance and acquisition of Physics' experimental skills. The study involved exposing all students to attend the same theory lessons and do the same homework assignments and examinations. On the other hand, one group of students were enrolled in physics experimental lessons in the laboratories and the second group only attended physics theory reinforcement lessons. The study results indicated that there was no measurable difference between laboratory experimental experiences on examination performance. However, there was a marked measurable and significant positive change on students' engagement in experimentation laboratory skills. The study concluded that using laboratory to teach experimental physics had a direct benefit on students' acquisition of experimental skills and did not introduce any negative impact on course examination performance. The reviewed study used experimental comparative design whereby the researchers aimed at finding out the impact of exposing students to physics hands-on laboratory practical. The current study used explanatory sequential design to determine the effect of allocation of teaching and learning resources on teachers' job performance in Kisii County.

Mosotho (2017) study in Lesotho assessed the availability of laboratory resources in readiness for the introduction of A-level Chemistry. It randomly sampled 263 first year students at the National University of Lesotho in the Faculties of Health Sciences, Agriculture and Science and Technology. It used questionnaires to collect data from the participants. The results of the study revealed that 90% of schools had physical laboratories but are not adequately used due to lack of materials. The reviewed study contacted former high school students to report about the state of laboratories in their former schools by use of one research instrument. The current study used the participants on the ground to report about the phenomenon under study, to guard against any reporting bias that maybe occasioned by use of former students that could be harbouring negative feelings about their former schools.

In Kenya, Chepkonga (2017) investigated the influence of learning facilities on the provision of quality education in public early childhood development education in West Pokot County. The study used mixed method research by employing questionnaires, checklist and interview guide. It sampled 4 education officers, 37 head teachers and 205 teachers. The study used both descriptive and inferential statistics to analyse collected data. The results of the study indicated that there was no statistically significant influence of learning facilities on the provision of quality education in West Pokot County. The computed value x^2= 2.532, df=4 and p=0.687 and the critical value of x^2=13.277, df=4 and p=0.01. In conclusion, the study noted that learning facilities in E.C.D.E centres in West Pokot do not result in improvement in the provision of quality education in the mentioned centres. Thus, the study recommended that the West Pokot County government should make it a priority to improve on construction of learning facilities to allow for the

teachers to be able to provide quality education to the learner. However, the contributions of learning resources on academic performance have been found to be statistically significant by (Ondieki et al., 2020).

3. Materials and Methods

This study applied Mixed Method Research design of explanatory sequential approach which involved prioritising quantitative phase over qualitative phase with data integration (Creswell and Creswell, 2018). The rationale for mixing in the current study was that neither quantitative nor qualitative methods were independently sufficient to capture the trends and details of the situation, such as a complex issue of Principals' leadership practices on learners' academic performance in K.C.S.E. in the study locale. In this study, first, integration was done at methods level by connecting whereby, the researcher first analysed the quantitative data, then used its findings to develop sampling criteria for the follow-up qualitative phase (Fetters et al., 2013). Secondly, integration was done at the interpretation and reporting level using narratives and joint displays (Guetterman et al., 2015). Mugenda and Mugenda (2008) recommends that 10% to 30% of the target population is adequate for a sample. Based on this guideline, 25% of the target population of the schools was selected for the study because their number is comparatively smaller (Cohen, 2011). Thus 85 schools were sampled for the study. On the other hand, the principals of the participating schools were purposively sampled.

The 1360 Heads of Departments and 2,991 teachers who together constitute 4,351 of the remaining respondents were sampled proportionately to arrive at 114 HoDs and 251 teachers in the sample. Quantitative data were collected by use of Questionnaires while in-depth interview schedule was applied to collect qualitative data. This aided in testing the agreement of findings obtained from different sources and to enhance clarity and consistency of the findings (Creswell and Creswell, 2018). To ensure content, construct, criterion and face validities of instruments of this study, expert validation was applied (Taherhoost, 2016; Sangoseni, et al., 2012; Olson, 2010). While reliability was achieved through Cronbach's Coefficient Alpha for the Questionnaires which averaged at 0.781. The researcher obtained introductory letter from the Board of Postgraduate Studies (BPS) of Jaramogi Oginga Odinga University of Science and Technology (JOOUST) to allow him get permit and licence from the National Commission for Science, Technology and Innovation (NACOSTI) and authority letter from JOOUST Ethics Review Committee (E.R.C.). The above documents assisted the researcher to be permitted to conduct the pilot study and the main study by the County Commissioner-Kisii, County Director of Education-Kisii, and principals of the sampled schools, Heads of Departments and teachers. The principals who were sampled for the study were consulted in readiness for the study and assisted the researcher to seek consent of HoDs and teachers to participate in the study.

4. Results

4.1. Phase 1- Quantitative Research Findings

To realize this objective, the respondents were first asked to express their opinions on the frequency of teachers' transfer from their schools. The results are presented in Figure 1.

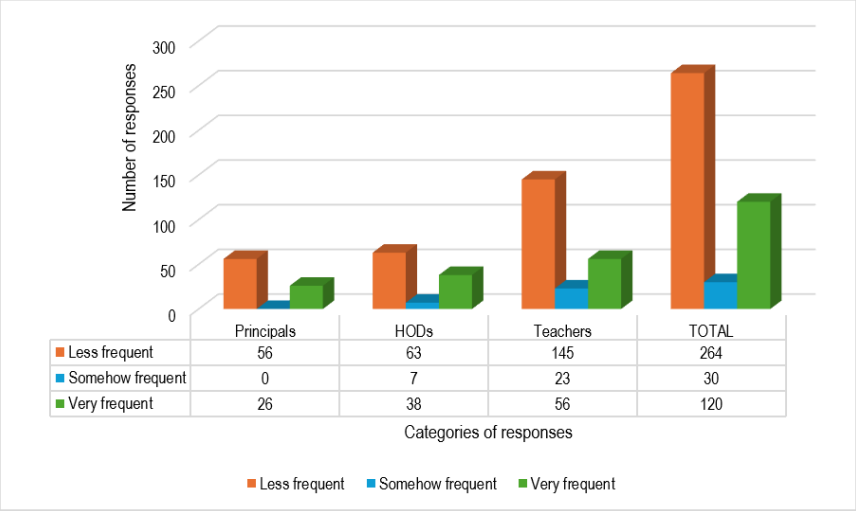

Figure 1. Frequency of teacher transfers

Figure 1 shows that 145(35.02%) of the respondents indicated that teachers are transferred less frequently, 23(5.56%) somehow frequent, 56(13.52%) very frequently. Collectively, respondents were in agreement that the rate at which teachers get transferred was not so high to impact on instructional delivery. Research studies have established

that frequent teacher turn-over in a school lowers academic performance especially when high performing principals or teachers are transferred from a school without equal replacement (Bleustein and Goldschmidt, 2021). This research finding suggest that there is staffing stability in schools in the study locale and that the period teachers spend in a particular school, may provide them with a chance to be accustomed with the established school climate to be able to perform well (Wanjala, 2019). During the interviews, the respondents agreed with the quantitative findings. For example, one of them said: *Teachers' transfers have not been so frequent in my school. A similar trend is experienced in many of our schools. Most transfers are usually done at the end of the year so that curriculum delivery is not affected (P11).*

4.1.1. Duration of teacher who has been transferred

Respondents were further asked to indicate the duration it takes for a transferred teacher to be replaced. Their responses are in Figure 2.

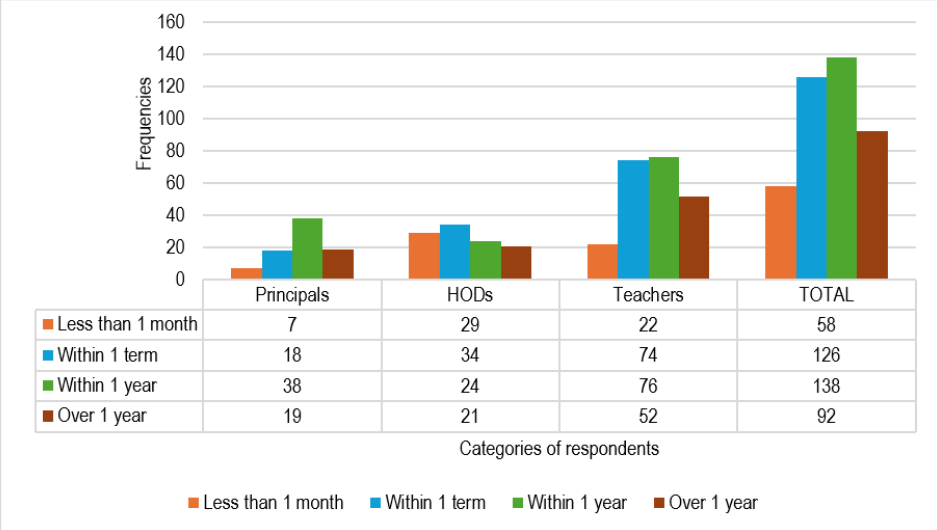

Figure 2. Duration taken before a transferred teacher is replaced

Figure 2 show that 58(14%) of respondents indicated that replacing a transferred teacher would take less than one month, 126(30.43%) within one term, 138(33.33%), noted that it would be done within one year and 92(22.22%) noted that it would take over one year to replace a transferred. The finding of this study is concurrence with those of (Adika and Sika, 2019 and Ireri et al., 2023), which found out that when there is adequate staff there would timely syllabus coverage to result in good academic performance. This research findings suggest that the T.S.C. ensures that teachers who are transferred from schools are replaced as soon as possible so that the quality of teaching is not compromised due to teacher shortage because research findings have discovered that increasing teachers' workload leads to a decrease in academic performance (Adika and Sika, 2019). Similarly, the study of Wanjala (2019) discovered that unclear transfer policies of the T.S.C. reduced academic performance in Primary schools of Merti Sub-County. During the interviews, the respondents highlighted that teachers being the first school related factor that influence academic performance, they ensure that the schools are well staffed by the T.S.C and in case of delays in replacing transferred teachers, the school employs Board of Management (B.O.M) teachers. For instance, an Extra-County school principal said: *I make sure my school is well staffed by either the T.S.C. or the B.O.M to enhance the quality of classroom instructions for without teachers, there will be no teaching and learning (P8).*

4.1.2. Learners' Academic Performance in K.C.S.E. in Kisii County.

The study also sought the opinion of the respondents on the influence of principals' allocation of teaching and learning resources on learners' academic performance in K.C.S.E in Kisii County. Their responses are in Table 3.

Table 3. Descriptive statistics on ways by which principals' allocation of resources influences learners' academic performance in K.C.S.E. (N=414)

Item(s)	Mean	Std. Deviation
Ensure every department is well staffed with competent teachers to allow for good quality instructional delivery	4.38	.755
Avail all the teaching and learning resources to realize effective instructional delivery	4.14	.862

Item(s)	Mean	Std. Deviation
Have availed the laboratories for all the technical subjects to enable good quality teaching to improve on learning outcomes	3.79	1.100
Have installed the ICT devices and facilities in the school	3.39	1.266
Have ensured that teachers have the necessary capacity to use the ICT devices in instructional programs	3.33	1.192
Have adequate power supply for ICT use in the school	3.45	1.255
Have adequate internet connectivity for use to integration ICT in the lessons	3.08	1.336
Do remind teachers to use ICT in lesson delivery to make teaching and learning to be interactive to promote learning	3.36	1.184
Ensure teachers use laboratories to offer practical lessons	4.02	.991
Encourage teachers to engage learners in practical lessons to allow them to acquire the 21st Century skills	4.15	.911
Comply with school's teaching and learning resources needs when making financial decisions	4.12	.946
Continuously involve other stakeholders in the teaching and learning of learners	4.19	.902
Overall	3.78	1.06

Table 3 shows the influence of principals' allocation of teaching and learning resources on learners' academic performance in K.C.S.E. is high (M= 3.78; SD= 1.06). Likewise the respondents agree that; Principals ensure every department is well staffed with competent teachers to allow for good quality instructional delivery (M=4.38 SD= 0.75), Avail all the teaching and learning resources to realize effective instructional delivery (M= 4.14 SD= 0.862), Have availed the laboratories for all the technical subjects to enable good quality teaching to improve on learning outcomes (M=3.79 SD=1.100), Have installed the ICT devices and facilities in the school (M= 3.39 SD =1.266), Have ensured that teachers have the necessary capacity to use the ICT devices in instructional programs (M=3.33 SD =1.192), Have adequate power supply for ICT use in the school (M= 3.45 SD = 1.255), Have adequate internet connectivity for use to integration ICT in the lessons (M= 3.08 SD =1.336), Do remind teachers to use ICT in lesson delivery to make teaching and learning to be interactive to promote learning (M= 3.36 SD =1.184), Ensure teachers use laboratories to offer practical lessons (M=4.02 SD = 0.991), Encourage teachers to engage learners in practical lessons to allow them acquire the 21st Century skills (M=4.15 SD = 0.911), Comply with school's teaching and learning resources needs when making financial decisions (M= 4.12 SD =0.946), Continuously involve other stakeholders in the teaching and learning of learners (M= 4.19 SD = 0.902). These findings agree with those of Kipkoech and Mbungua (2019), which reported that availability and skilful use of teaching and learning resources influence learning outcomes. The research findings that the (M= 3.78; SD=1.06) suggest that with proper training of teachers and willingness to use the available teaching and learning resources, academic performance would improve (Abdurrauf et al., 2019).

During the interviews the respondents indicated that they avail the teaching and learning resources to support instructional programmes. For example, one of them said; *My school prioritizes procurement and utilization of teaching and learning resources by both teachers and learners to ensure that curriculum is properly implemented (P16).* However, other respondents expressed that they face financial constrains when they want ot avail the teaching and learning resources in the schools. For example, one reported that: *In adequate funding hinders teaching and learning resources acquisition in our schools. So, we find ourselves in situations whereby a school cannot purchase resources required for teaching the learners, so teachers end up improvising or forego the practical lessons and handle theoretical (P14).*

4.1.3. Correlation between Allocation of Teaching and Learning Resources and Learners' Academic Performance

The study also sought to find out on whether allocation of teaching and learning resources influence academic performance in K.C.S.E by application of Pearson's Product Moment Correlation test and a simple coefficient of correlation was computed and results are shown in Table 4.

Table 4. Pearson correlation analysis to establish the influence of principals' allocation of teaching and learning resources on learners' academic performance in K.C.S.E.

		KCSE Mean Score
Allocation of teaching and learning resources	Pearson Correlation	0.072
	Sig. (2-tailed)	0.143

Table 4 presents there is a moderate positive, but insignificant relationships found between principals' allocation of teaching and learning resources and learners' academic performance in K.C.S.E. (.072, p>0.05; 2-tailed). These results concur with the findings of Park and Weng (2020) among the OECD countries which found out that resources use by students leads to positive change in performance. The finding implies that the principals' allocation of teaching and learning resources may contribute to better academic performance as it has been confirmed by other studies (Othoo et al., 2019). The interviews held with the respondents further shed light on this phenomenon and indicated that school face challenges of resources acquisition due to lack of funds to the extent that the few resources available do not serve in all instructional programmes. One of them said: *Lack of finances hinders principals from ensuring that the schools have adequate teaching and learning resources, and this affects effective curriculum delivery (P3).*

4.1.4. Hypothesis testing.

This study aimed at determining the influence of principals' allocation of teaching and learning resources on learners' academic performance in K.C.S.E. in Kisii County. The influence of Principals' allocation of teaching and learning resources on learners' academic performance in K.C.S.E. shown in Table 8 was determined using Pearson's Correlation Coefficient method. The results computed by SPSS version 29 computer programme were r = .072, p>.05. These results show that principals' allocation of teaching and learning resources was not significantly correlated to academic performance in K.C.S.E. Therefore, it does not influence learners' academic performance in K.C.S.E in Kisii County since p>.05 at 95% confidence level. It might suggest that the allocation of teaching and learning resources done in the Secondary schools are not effective in resulting to a positive change in teachers' classroom practices to contribute to high quality learning outcomes because they are not adequately supplied to schools due to high enrolment in most of the schools (Bos et al., 2022). The linear regression model is expressed as:

$$Y = \beta_0+\beta_1X_1+\epsilon, \quad (1)$$

Where, Y = Learners' academic performance in K.C.S.E. β_0 = Constant term, that is the predicted value of learners' academic performance if allocation of teaching and learning resources is zero. β_4 = Beta coefficient (contribution of allocation of teaching and learning resources on learners' academic performance. X_4 = Principals' allocation of teaching and learning resources. ϵ = Standard error (other variables that may influence learners' academic performance but are not included in the model and are assumed not to interfere with allocation of teaching and learning resources for example, principals' self-efficacy. The direction of the relationship between Principals' allocation teaching and learning resources on learners' performance in K.C.S.E was also analysed. Table 5 presents the coefficients and model summary.

Table 5. Results of Coefficient Determination

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
0.072[a]	0.005	0.003	25.1706	0.005	2.152	1	412	0.143

a. Predictors: (Constant), Principal's allocation of teaching and learning resources

b. Dependent Variable: KCSE Mean Score

Table 5 observed that allocation of teaching and learning resources had a moderate positive influence on academic performance in K.C.S.E. but was insignificant, (r =.072, N =412, p>.05). Therefore, the null hypothesis that principals' allocation of teaching and learning resources do not influence learners' academic performance in K.C.S.E. was upheld and the alternative hypothesis allocation of teaching and learning resources influence earners' academic performance in K.C.S.E. was rejected. Correspondingly, Okemwa et al., (2020) study in Nyamira County identified that inadequate infrastructural facilities negatively affects academic performance. The research finding suggest that other factors including Principals' leadership style and school context (Bos et al., 2022) may influence academic performance as indicated by the standard error of estimate (ε) which is 25.17060, suggesting that there were other factors of the magnitude of 25.17060 that might influence learners' academic performance in K.C.S.E. that were not observed by this study. Furthermore, the findings suggest that adequacy and proper use of teaching and learning resources may result in improvement in learning outcomes as indicated by the studies of (Othoo et al., 2019). During the interviews, the respondents indicated that academic performance depended on resources in the schools. For example, one principal emphasized that; *Schools which have adequate teaching and learning resources including teachers, laboratories and I.C.T technologies perform better than those which do not have the resources (P12).* The study also investigated

whether principals' allocation of teaching and learning resources predicts learning outcomes in K.C.S.E. The results are shown in table 6.

Table 6. Result of Analysis of Variance (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Regression	1363.403	1	1363.403	2.152	.143[b]
Residual	261026.3	412	633.559		
Total	262389.7	413			

a. Dependent Variable: KCSE Mean Score

b. Predictors: (Constant), Allocation of teaching and learning resources

Table 6 indicates that principals' allocation of teaching and learning resources was not a significant predictor of learners' academic performance in K.C.S.E. [F (1, 412) = 2.152, p>0.05]. This finding agree with Okemwa et al., (2020) which discovered that inadequate teaching and learning resources negatively affects academic performance. Contrastingly, the study of Ondieki et al., (2020) in Kenya confirms that allocation instructional resources lead to positive improvement in mastery of number activities among the pre-primary learners. The result of the current study may imply that teaching and learning resources are either inadequate or are not adequately used by the teachers and learners during the lessons as it has been established by research studies of (Kamau et al., 2018) that the absence of use of instructional resources results in low academic performance. During the interviews, the respondents revealed that teaching and learning resources maybe available in the school but may not be adequately used in the classrooms due to lack of proper training of the teachers. For example, one Sub-County school principal noted; *Due to inadequate pedagogical content knowledge, some teachers either do not use I.C.T. technologies or teach practical subjects practically leaving learners to struggle during exams and eventually perform poorly because of being unprepared(P5).* The study also investigated the contribution of principals' allocation of teaching and learning resources on academic performance in K.C.S.E. The results are presented in table 7.

Table 7. Result of Hypothesis Testing

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	-3.988	6.228		-0.64	0.522	-16.231	8.254
Allocation of teaching and learning resources	2.367	1.613	0.072	1.467	0.143	-0.805	5.538

a. Dependent Variable: KCSE Mean Score

Table 7 indicates that allocation of teaching and learning resources which is Y = -3.988+ 2.367X1, means that for every one unit increase in allocation of teaching and learning resources, there was an increase in academic performance in K.C.S.E by 2.367 units. The findings of this study are in concurrence with Mosotho (2017) study in Lesotho and Chepkonga (2017) in Kenya which separately discovered that availability of Laboratories for Science subject and teaching and learning resources in E.C.D.E. centres do not significantly contribute to learning outcomes respectively because teachers are reluctant to use them, or they are inadequate. This research findings suggest that availability of teaching and learning resources alone may not produce good academic results if supervision of instruction by the principal to inform how they are used, teachers' skills and whether they are adequate (Kamau et al., 2018). During the interviews, the respondents disclosed that in some cases the teaching and learning resources such as I.C.T. technologies are not adequate for the instructional programmes while in other cases, it is lack of teacher commitment to implement the curriculum as required due to poor attitude. For example, one respondent said: *We lack I.C.T. technologies for the teachers to integrate lessons. However, some of our teachers are not fully committed to teach (P8).*

4.2. Phase 2: Qualitative Research Findings

The objective of this study was to establish the effect of Principals' allocation of teachers and learning resources on learners' academic performance. This objective had two research questions. The first question sought information on what influences Principals' allocation of teaching and learning resources while the second research question was; how does the allocation of the resources link with learners' academic performance in K.C.S.E. On the first research

question, the respondents reported that what mostly influence their allocation of learning resources such as classrooms, laboratories and teachers were; the school need for the resource and availability of finance. One of the respondents reported: *At my school we always do stock taking at the end of the year to find out the status of our teaching and learning resources in terms of quantity and state in the case of physical facilities and learning materials such as books. On the other hand, we determine Curriculum based establishment (C.B.E) per subject area (P6).*

Similarly, another respondent noted that: *Availability of finance controls what we need to buy. Many at times we have a lot to be bought and allocate to the teachers and learners, but inadequate finance hinders our plans to buy very critical items including ICT devices, laboratory materials and hiring new teaching staff in understaffed subjects and departments (P13).* The reports of the respondents suggest that whereas the principals are guided by school needs when they allocate teaching and learning resources, inadequate finances hinder them from acquiring them and allocating to the teachers and learners. This finding concurs with that of Othoo et al., (2019) which found out that inadequate financial base of a school impacts negatively on allocation of teaching and learning resources.

On the link between allocation of teaching and learning resources with learners' academic performance in K.C.S.E, the respondents noted that when the resources are allocated in time and prudently used by the teachers and learners, improvement in learning outcomes is realized. One of the respondents said: *Adequate and equitable allocation of teaching and learning resources accompanied by good use during teaching and learning improves academic performance (P5).* Another respondent added that: *The change in teacher –student ratio from 1:76 to 1:52 and availability of laboratories in my school contributed to improved performance in K.C.S.E. from a mean of 3.961 in 2017 to a mean of 4.275 in 2018 (P8).* These findings are in concurrence with the findings of quantitative study which revealed that allocation of teaching and learning resources has a positive correlation with learners' academic performance in K.C.S.E. It is also in agreement with the findings of Okey (2020) study which reported that resources are a critical components of quality education.

4.2.1. Quantitative and Qualitative (Triangulation Matrix)

The results of integration at interpretation stage are presented in Table 8 in form of a matrix.

Table 8. Summary of Quantitative and Qualitative (Triangulation Matrix)

Objective and Hypotheses	Quantitative	Qualitative	Conclusions
To establish the effect of principals' allocation of teaching and learning resources on learners' academic performance in K.C.S.E. in Kisii County.	Allocation of teaching and learning resources –It had a moderate positive influence on academic performance in K.C.S.E but was insignificant, (r =.072, N =412, p>.05). Therefore, the null hypothesis was upheld.	Adequate and equitable allocation of teaching and learning resources accompanied by good use during teaching and learning improves academic performance. (P5).	The findings are also in agreement with the findings of Okey (2020) study which reported that resources are critical components of quality education. Similarly, Mogaka (2019) study revealed that availability and utilization of physics laboratory equipment had a relationship with students' academic achievement.
Principals' allocation of teaching and learning resources does not affect learners' academic performance in K.C.S.E. in Kisii County.	These results align with the findings of Dianz et al., (2019) study in the Canary Islands and Park and Weng (2020) among the OECD and with that of Ondieki et al., (2020) in Kenya which confirms that allocation instructional resources lead to positive improvement in mastery of number activities among the pre-primary learners.	Changes in teacher – student ratio from 1:76 to 1:52 and availability of laboratories in my school contributed to improved performance in K.C.S.E. from a mean of 3.461 in 2017 to a mean of 4.725 in 2018. (P8).	

Table 8 shows the inferential statistics obtained in the first phase of the study shows that Principals' allocation of teaching and learning resources had a weak positive correlation with learners' academic performance but was not

significant in contributing to academic performance in K.C.S.E. Qualitative findings also confirmed that only if the resources are strategically and equitably allocated would they contribute significantly to a positive change performance

5. Conclusions

This study concludes that the allocation of teaching and learning resources demonstrates a weak positive and insignificant relationship with learners' academic performance in the K.C.S.E. Moreover, it had a moderate positive and insignificant influence on academic performance in the K.C.S.E. Consequently, the results further indicate that it was not a significant predictor of learners' academic performance in K.C.S.E. Furthermore, the results indicate that the allocation of teaching and learning resources, represented by Y = -3.988 + 2.367X1, signifies that for every one-unit increase in the allocation of teaching and learning resources, there was an increase in academic performance in K.C.S.E. by 2.367 units. The qualitative results revealed that an inadequate quantity of teaching and learning resources and teachers' failure to utilize them due to unpreparedness were impeding efforts to improve academic performance in K.C.S.E. Hence, both the quantitative and qualitative findings concur that the allocation of teaching and learning resources has a weak positive association with learners' academic performance in K.C.S.E., but it is a significant predictor of learners' academic performance. Therefore, the principals' allocation of teaching and learning resources was found to have a weak positive association with learners' academic performance in the K.C.S.E. This study concluded that if resources are strategically allocated and properly utilized, they may significantly contribute to academic performance in the study locale.

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