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THE ROLE OF SCHOOL CULTURE THROUGH INSTRUCTIONAL MANAGEMENT ON LEARNER PERFORMANCE IN MATHEMATICS IN PUBLIC SECONDARY SCHOOLS IN NYANDARUA COUNTY, KENYA

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ABSTRACT

Instructional management as an aspect of school culture is a product of self-supportive approach of thinking in improving learning outcome in Mathematics. This study sought to examine effect of school culture through instructional management on learner performance in Mathematics in public secondary schools in Nyandarua County. Focus was on testing as teaching, instructional supervision and syllabus coverage as determinants of learner performance in Mathematics based on perceptual and self-concept theories of Zone of Proximal Development (ZPD) developed by Lev Semenovich Vygotsky. The philosophical foundation of this study stems from constructivist epistemology with an assumption that reality is a subjective product of human perception.

Descriptive research design was adopted and questionnaires collect data to sought information from learners in Form Three and Mathematics teachers systematically sampled to ensure comprehensive geographical coverage of Nyandarua County.

Findings of the study revealed that testing as teaching (p-value= 0.000) and instructional supervision (p-value = 0.042) were significantly associated with learner performance in Mathematics at 95% CI.

The study recommended strengthening of testing as teaching as instructional approach through in servicing for improved learner performance in Mathematics. On further research, exploring the position of syllabus coverage as a component of instructional management in facilitating mastery of Mathematics content for better learner performance in Nyandarua County and beyond, could be investigated.

Key Words

School Culture, Instructional Management, Performance in Mathematics

INTRODUCTION

Learning performance in Mathematics is greatly influenced by experiences learners go through in the class during instructional process. Huber *et al*. (2017) asserted that instructional management forms a socio-cultural perspective of class experience that may be critical to performance in Mathematics.

Again, instructional management as an aspect of school culture is a product of self-supportive approach of thinking in improving learning outcome in Mathematics. More still, König et al (2021) added that instructional quality hinged on positive school culture that focuses on classroom management, student support, and cognitive activation in learning Mathematics. Additionally, learners' experiences in class are dependent on instructional materials available and teacher's knowledge of learners' backgrounds as well as their ability. Further, Lee (2019) added that a school culture that recognizes the teacher as a critical decision-maker in managing instructions would give better learner performance across subject areas.

Therefore, it was imperative to establish the role of school culture through instructional management in influencing performance of Mathematics in Nyandarua County. Instructional management requires appropriate preparation, efficient use of allocated time, maintaining order in the classroom and managing learner behavior. Additionally, a positive class culture allows for adoption of variety of pedagogical approaches that influence learner performance in Mathematics in secondary schools.

In concurrence, Remillard and Bryans (2014) asserted that appropriate instructional methods enhance learner performance in Mathematics.

However, inappropriate approaches stifle knowledge retention and application in secondary schools. Pedagogical approaches employed by teachers of Mathematics would only facilitate grasping of new concepts when there is appropriate utilization of instructional resources in a motivating class environment. According to Thevenin et al. (201) during instructional process, teachers authoritatively lead in managing teaching and learning of Mathematics. Further, König et al (2021) asserted that instructional management as a dimension of school culture comprises teacher behavior that focuses on encouraging students, fostering a positive classroom climate, and providing adaptive learner support.

Much have been done to improve learner performance through quality mathematics instructions as an anchorage for technological and economic development in Kenya. With these efforts, secondary schools in Kenya and Nyandarua in particular still register low learner performance in mathematics countrywide, which begs for the need to investigate the role of school culture in learner performance at KCSE. Scholars, have attributed low learner performance in mathematics on attitude, pedagogical approaches, inappropriate intelligence level, teacher-learner ratio and lack of understanding among others. The focus of this study was on how appropriate secondary school culture is generating learner's commitment to learning mathematics towards better learning performance in Nyandarua County.

The study focused on institutional values, beliefs and ideal systems instructional management and resultant learner performance in mathematics and specifically on testing as teaching, supervision and syllabus coverage as determinants in sustaining

learning performance in mathematics among public secondary schools in Nyandarua County, Kenya

LITERATURE REVIEW

Özdemir (2012), explained school culture as a set of properties of the institutional environment as perceived by individuals which would influence learning outcome. Lee (2019) added that school culture is sets of norms, goals, and values that shape the learning and teaching environment to promote learner achievement**.** Every school cultivates a unique culture which depends on an exceptional environment with varying inputs and processes for improved learning performance in Mathematics. Escalona (2019) argued that a positive school culture exists in institutions where the learner may be eager to execute competencies for accelerated performance in Mathematics. This study considered school culture as a product of self-supportive approach of thinking in educational management which brings together players in unified approach to learner performance in Mathematics.

Further, Namunga (2017) noted that effective instructional management should incorporate supervision as a necessity in creating an inviting learning climate for learners' performance in various subjects. This study looked at the extent Mathematics teacher employ diverse methodologies toward coverage of syllabus and how much school routine is an enabler in improving performance at KCSE.

In a positive school culture, testing and managing test results should be part instructional management needs to be motivational to learners. In addition, König et al (2021) argued that instructional approaches in Mathematics should make testing adequately stimulating as well as being flexible towards encouraging reasoning and knowledge retention. In practice, developing assessment modalities are part of instructional preparation for the purpose of examining the level of understanding and application of concepts learnt in Mathematics in secondary schools. Additionally, Ifeanyi *et al*. (2015) observed that the purpose for examining concepts learnt is to enable teachers to gain information for planning teaching and learning purposely to improved learner performance in Mathematics.

More still, testing as teaching involves quality of assessment procedures and materials that are significant part of instructional process for continuous learning in Mathematics. Further, Raufelder *et al*. (2018) added that a positive school culture strives to make assessment through testing as teaching a stimulating factor in learner interest towards learning in Mathematics. This study focused on Assessment modalities and result management as stimulating that would influence learning performances in Mathematics in Nyandarua County.

Stimulating ability of assessment modalities and management of result is a critical aspect of school culture.

Nwankwo *et al*. (2014) observed that less stimulating assessment modalities and management of result would make learners to exhibit some forms of anxiety, restlessness, trembling, fidgeting or panicking. In practice, an inviting school culture should make learner more eager and less anxious taking test and should be taken as normal class situation. In an article on effects of systematic desensitization technique on test anxiety among secondary school students Ifeanyi *et al*. (2015) established that majority feared that learners usually feel uneasy, fearful and anxious as tests approaches. In concurrence with Nwankwo *et al*. (2014) and Ifeanyi *et al*. (2015) assertions, Odeyemi-Bsd (2020) argued that that teacher-learner relationship over time should develop to reduce test anxiety or else it could be a serious academic impediment to better performance in Mathematics.

Further, Tong (2019) advised that when teachers are developing assessments care should be taken that testing supports teaching and learning needs. Teacher should therefore make testing and managing test results friendly to the learners as a basis of testing for teaching to improve performance in Mathematics.

Effective supervision in instructional management leads to significant improvement in learning performances. In concurrence, Oyewole and Ehinola (2014) established that when instructional management supervision is properly organized and executed it could lead to positive improvement in the performance.

Consequently, to raise learning performances supervision should focus the ability of teachers to combine relevant inputs from methodology, resources to assessment in Mathematics. Pedagogical approaches are considered appropriate when instructional management results are proper syllabus coverage across subject areas with remarkable flexibility among Mathematics teacher in secondary schools. Proper syllabus coverage in Mathematics as noted by Oyier et al. (2017) requires adequate instructional resources and a motivating class environment where teachers master learners to facilitate learning.

More still, a positive school culture should adequately provide instructional resources for the teachers to appropriately stimulate learners' reasoning capacities and knowledge retention through flexibility in terms of methodological approach. Secondary school principals are considered as instructional or pedagogical leaders with roles including supervision of teaching and learning Mathematics. Additionally, Moolman *et al*. (2020) acknowledged that serious instructional leaders make Mathematics learning outcome a primary goal. As instructional leaders, secondary school principals need to focus on such activities as supervising instructions and coordinating curriculum implementation as a whole in order to improve learning outcomes in Mathematics. More still, Mahdi and Almsafir (2014) added that the effective instructional supervision requires secondary school principals to develop academic standards to monitor learning in Mathematics as

well as maintaining positive interaction within the institution. Again, Namunga (2017) established that effective syllabus coverage is dependent on appropriate utilization of instructional resources as well as learning approaches employed during by teachers. Further, Charalambous and Litke (2018) added that the task of managing the classroom requires Mathematics teacher to prepare, structure, and evaluate lessons as well as to motivate and support students. It would include dealing with heterogeneous learning groups in the classroom and this study expected that effective instructional management would strengthen teaching and learning Mathematics through supervision in Nyandarua County, Kenya.

The success of instructional process in teaching a particular Mathematical concept lies in the pedagogical approach adopted by the teacher. As noted by Bayar and Karaduman (2021) without teachers using diverse methodological approach, teaching some mathematical concepts would appear challenging to learners. Again, as a science of teaching pedagogy in Mathematics instructional management would benefit greatly from diverse methods to improve learning outcome at secondary level of education. More still, Schlesinger and Jentsch (2016) argued that theoretical and methodological challenges in Mathematics instructions requires the teacher to provide learning opportunities focusing on better learning achievement. In addition, effective learning in Mathematics requires teachers' familiarity on teaching approaches which presumably include generic knowledge for successful teaching than incorporate pedagogical concepts, principles, and techniques not necessarily bound by topic or subject matter. Further, Schoenfeld (2013) in an article on classroom theory and practice added that apart from an understanding of how learning takes place, a teacher should have knowledge of methods of assessment and learning theories to improve performance.

Instructional management require consideration of Schlesinger and Jentsch (2016) assertion that appropriate syllabus coverage techniques in Mathematics may greatly depend on belief that a teacher possesses and would influences performance. Building on teachers' ability to maintain cognitive activation in the classroom, this study expected Mathematic teacher in Nyandarua to possess pedagogical knowledge that would facilitate learning towards improved performance. Again, Oyier et al (2017) asserted that time allocation is a strong factor in relationship to learner performance across subject areas, Mathematics included. In efforts to create an inviting culture, secondary school principals could consider routines as useful lever for change when the focus in better performance in Mathematics among other subjects. However, Ifeanyi *et al*. (2015) felt that it is under certain conditions and in specific situations; routines can be changed in secondary schools. In practice change routines to create learning is possible when the context is restructured in terms of policies, rules and responsibilities. Schlesinger and Jentsch (2016) on

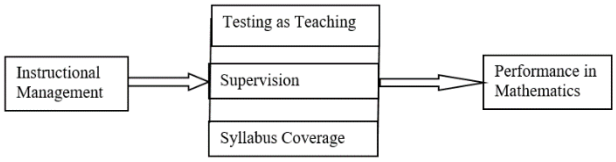
their part argued that there must be a clear differentiation between adapting a routine to a concrete specific situation (performative aspect) and changing routines in a longer perspective (ostensive aspect), is not sufficiently visible.

This foundation of this study is based on perceptual and self-concept theories of Zone of Proximal Development (ZPD) developed by Lev Semenovich Vygotsky in late 1920s. As noted by Tinungki (2019), ZPD is the distance between the actual development level as determined by independent problem solving and potential level determined through guided problem solving in collaboration with more capable peers. According to Silalahi (2019) in the minds of constructivists belief a learner in ZPD for a particular task requires appropriate assistance to successfully complete it. In practice, creation of ZPDs involves assistance that may be provided by a positive school culture sensitive the learner's current capability.

More still, Vygotsky described the current or actual level of development of the learner and the next level attainable through the use of mediating semiotic and environmental tools that may be depended on an inviting school culture embracing peer facilitation. Further, Tinungki (2019) noted that according to constructivist philosophy learning happens through an accommodation process which starts with construction of knowledge through framing of one's mental representation of an enabling and inviting instructional environment befitting new experiences.

An inviting school culture would benefit instructional management embracing six ZPD elements namely; assistance, mediation, cooperation, ability to imitate, targets and difficult times or getting out of the comfort zone (Silalahi, 2019). In an inviting instructional environment, the teacher's job is to facilitate learning, raise problems, and aid when needed by students in ZPD. So, to make progress to a higher level of development, students in learning need to be assisted, guided, and directed so that they can solve problems independently

Conceptual Framework



PURPOSE AND HYPOTHESIS OF THE STUDY

The purpose of the study sought to examine effect of school culture through instructional management on learner performance in Mathematics in public secondary schools in Nyandarua County, Kenya. The study addressed testing as teaching, instructional supervision and syllabus coverage as determinants of learner performance in Mathematics at KCSE

Ho. There is no statistically significant relationship between instructional management and learner performance in Mathematics in public secondary schools in Nyandarua County, Kenya."

METHODOLOGY

The philosophical foundation of this study stems from constructivist epistemology that considers observable and perceived evidence as forms of scientific findings in generating sound evidence.

Constructivist scholars assume that reality is a subjective product of human perception; and that reality can have as many meanings as the perceiver's cognitive ability (Nugroho, 2017). Methodologically, constructivist scholars apply qualitative and quantitative methods and, in this case, descriptive research design was adopted to provide a statistical measure on the influence of school culture through instructional management on learner performance in Mathematics in secondary schools found within Nyandarua County. The study sought information from learners in Form Three and Mathematics teachers in public secondary schools within Nyandarua County. The initial sampling process involved implementation of systematic sampling within each sub-county, ensuring the selection of at least three secondary schools to ensure comprehensive geographical coverage of Nyandarua County.

Within the selected secondary schools, the study randomly sampled at least one form three streams and included all form three learners from these streams. The study used questionnaires, interview schedules, observation schedules and documentary analysis to capture both quantitative and qualitative data

RESULTS AND DISCUSSIONS

Out of 90 sampled Mathematics teachers in participating secondary schools 76 (84%) filled up questionnaires while 748 out of 750 expected form three learners returned filled up questionnaires.

Out of the 15 sampled pubic secondary schools, 12 had an average KCSE score below a C+ in Mathematics accounting for 80% for the period of five years falling between 2018 and 2022. This suggests that a significant majority of the sampled secondary schools in Nyandarua County are facing issues in raising quality of performance in Mathematics at KCSE.

Table 1: Public Secondary Schools' Demographics in Nyandarua County

Variables	Categories	n	%
	Total	15	100
School Type	BB	2	13
	GB	4	27
	BD	0	0
	GD	0	0
	MD	4	27
	MB	3	20
	MD&MB	2	13
	Total	15	100
Number of Teachers	Under 10	1	6.7
	Nov-20	5	33
	21-30	4	27
	31-40	3	20
	Over 40	2	13
	Total	15	100

In relation to type of school, the results indicated that majority were girls boarding (4, 26.7%) and mixed day (4, 26.7%) secondary schools. Additionally, the p-value was 0.554, indicating that institutional type and school performance in Mathematics were not statistically associated. However, none of the day schools featured in the high performing category, which underscore the relevance of boarding facilities in enhancing teacher-learner interaction as well school plant in positive performance outcomes.

This position is also supported by Hoeg and Bencze (2017) assertion that higher performance in Mathematics in enhanced contact-time between learners, instructional materials and teachers. Regarding the number of teachers in the school, most schools (5, 33,3%) had between 11 and 20 teachers, with two (13.3%) having more than 40 teachers. The p-value (0.035) revealed a statistical association between number of teachers and learner performance in Mathematics. The results signify that high number of teachers may enhance teacher-learner interaction and supervision of instructional management, which promotes a positive culture of as far learner performance in Mathematics is concerned. The results support Watene (2021) perspective that high number of teachers in a secondary school institution may likely improve learner performance across different subject specialties.

The teachers' demographics included in the study were gender, qualification, age and teaching experience.

Table 1: Profile of Mathematics Teachers

Variables	Categories	N	%
Gender	*Male*	58	76.3
	Female	18	23.7
	Total	76	100
Qualification	*SI/Diploma*	1	1.3
	Graduate	71	93.4
	Post Graduate	4	5.3
	Total	76	100
Age	*Under 25*	5	6.5
	25-34	44	57.1
	35-44	20	26
	45-55	6	7.8
	Over 55	2	2.6
	Total	77	100
Teaching Experience	*Under 5*	34	44.7
	6 to 10	26	34.2
	11 to 15	6	7.9
	16 to 20	3	3.9
	Over 20	6	7.9
	Total	76	100

Table 2 results revealed that 58(76.3%) of Mathematics teachers were male while 18 (23.7%) were female. The p-value of 0.959 indicated that gender of the Mathematics teacher does not significantly contribute to learner performance in Mathematics. The results are tandem with Oyier *et al*. (2017) assertion that teachers' participation teaching Mathematics disregards gender. Regarding teacher qualification in the sampled schools, majority were graduates (71, 93.4%) while four (5.3%) and only one (1.3%) had an SI/Diploma qualification. Additionally, the p-value results of 0.397 showed a lack of statistical correlation between teacher qualification and learner performance in Mathematics. The results reveal that teacher qualification may not directly contribute to learner performance in Mathematics. This finding is contrary to Mahdi and Almsafir (2014) argument that better qualified teachers of Mathematics provide better guidance for learners towards better learner performance in Mathematics.

Regarding age stratification, majority of Mathematics teachers in the sampled schools (44, 57.1%) had between 25 and 34 years of age, while 20 (26%) had between 35 and 44 years of age.

In addition, the associated p-value of 0.061 revealed a lack association between teacher's age and learner performance in Mathematics. In terms of teaching experience, majority of the teachers in the sampled secondary schools had taught for less than five years (34, 44.7%) while 26 (34.2%) had teaching expertise of six to 10 years. The associated p-value of 0.268 showed there was no statistical relationship between teaching experience and learner performance in Mathematics. By implication, the study recognized that teachers professional experience did not have any effect on instrumentation of mathematical materials in performing and non-performing schools. The results contradict the findings of Reddy (2019) who established a strong connection between teaching experience and learner performance in Mathematics.

The focus aimed to investigate the influence of instructional management, as a key aspect of school culture with a specific focus on Testing as Teaching, Instructional Supervision, and Syllabus Coverage, on learner performance in Mathematics. The analysis sought to understand how instructional resources impact learning outcomes in Mathematics within public secondary schools in Nyandarua County. Respondents from the respective educational institutions rated their level of agreement with various aspects of instructional management on a scale of 1 to 5, with 1 indicating the lowest and 5 indicating the highest degree of observation by the targeted respondents.

Learning performance across subject areas is greatly influenced by experiences learners go through in the class during instructional process. Huber *et al*. (2017) asserted that school leadership and curriculum implementation from a socio-cultural perspective on instructions class experience is critical to performance in Mathematics. The results in tables 3 presents the descriptive statistics on the teachers' perceptions regarding instructional management respectively in secondary schools in Nyandarua County.

Table 4 Teachers Perception on Instructional Management

	N	Min	Max	Mean	SD	Skewness	Kurtosis
Testing in Mathematics is done to generate learner interest.	76	2	5	4.16	.834	-.591	-.552
Testing results are used to improve.	76	2	5	4.09	.803	-.646	.057
To enhance instructional supervision teachers, tend to master learners by names.	75	2	5	4.16	.823	-.757	.064
Teachers are flexible in pedagogical	74	1	5	4.15	.715	-1.150	3.900

approaches in teaching Mathematics.							
To enhance syllabus coverage teachers, use diverse methodologies.	75	2	5	4.23	.764	-.599	-.413
School routine encourages syllabus coverage.	75	2	5	4.36	.729	-.895	.260

In a positive school culture, testing and managing test results should be part instructional management needs to be motivational to learners. The findings in table 34 suggest that teachers mostly use testing in Mathematics as a strategy to generate learner interest (mean 4.16, SD=0.834) and that management of testing results is used for learning improvement (mean 4.09, SD=0.803) in secondary schools within Nyandarua. The results from this study suggest that Mathematic teachers in Nyandarua using testing as part of instructional approaches to stimulate learning and encourage reasoning and knowledge retention (Namunga, 2017). In practice, stimulating ability of assessment modalities and management of result critical aspects of school culture and should be encourage in secondary schools in Nyandarua county.

Effective instructional management should incorporate supervision as a necessity in creating an inviting learning climate for learners' performance in Mathematics.

Teachers are reported enhanced instructional supervision through knowing learners by their names (mean, 4.16, SD=0.823) and demonstrating flexibility in pedagogical approaches when teaching Mathematics (mean, 4.15, SD=0.715). These findings are indicative that as secondary school principals in Nyandarua as pedagogical leaders are striving to make quality teaching and learning Mathematics a top priority and attempts to bring that vision to realization through instructional supervision (Oyewole & Ehinola, 2014)

To enhance syllabus coverage, Mathematic teachers reported to employ diverse methodologies (mean, 4.23, SD=0.764) and acknowledged that school routine across Nyandarua County is an encouraging factor (mean, 4.36, SD=0.729). From the study results, it seems Mathematic teachers agreeing that time allocated for teaching is adequate towards efforts of improving academic performance (Dimka, 2011). In general, the standard deviations indicate varying degrees of agreement among respondents for each item, suggesting differing perspectives on the effectiveness of these teaching practices for Mathematics education. Skewness and kurtosis values offer insights into the distribution characteristics of responses for each item.

The results in tables 4 presents the descriptive statistics on learners' perceptions regarding instructional management respectively in secondary schools in Nyandarua County.

Table4: Learners' Perception on Instructional Management

Sub-dimensions of Instructional management	N	Min	Max	Mean	SD	Skewness	Kurtosis
We are always encouraged to well on the next Mathematics test.	739	1	5	3.81	1.349	-0.874	-0.446
Our Mathematics teacher know us by name during the lessons,	743	1	5	3.55	1.575	-0.58	-1.233
We feel we are up to date with covering Mathematics Syllabus.	745	1	5	3.47	1.397	-0.489	-0.972

The result in table 4 show that the perception statement postulated as "We are always encouraged to do well on the next Mathematics test" yielded the highest mean rating of 3.81 out of 5, indicating that students generally feel positively about being encouraged to perform well in their Mathematics tests.

The relatively low standard deviation (1.349) suggests that responses are clustered around the mean, indicating a consistent perception among learners in Nyandarua County.

The skewness value of -0.874 and kurtosis value of -0.446 indicated that the distribution of responses for being encouraged to do well on Mathematics tests is negatively skewed with no significant extremes. As argued by Ifeanyi *et al*. (2015) majority of learners feel comfortable, less fearful and anxious as Mathematic test approaches in Nyandarua County.

The results on the perception statement framed as "Our Mathematics teacher knows us by name during the lessons" yielded a mean rating score of 3.55 out of 5, indicating that students feel moderately positive about their Mathematics teacher knowing them by name during lessons. The standard deviation (1.575) suggests that there is more variability in responses compared to the previous sub-dimension. The skewness value of -0.58 and kurtosis value of -1.233 indicated that the distribution of responses was negatively skewed with some variability in students' perceptions about being known by the teacher. The results imply that when a Mathematics teacher knows students by name, it fosters a sense of belonging and individual attention in the classroom. This personal connection can positively impact students' engagement and rapport with the teacher, leading to increased interest in the subject and active participation in lessons.

The findings of this study agree with Odeyemi-Bsd (2020) that teacher-learner relationships over time should develop reduce anxiety or else it could be a serious academic impediment to better performance in Mathematics.

However, the higher standard deviation indicates that some students may not feel as recognized or known by the teacher, highlighting the need for more efforts in building teacher-student relationships to maximize the potential positive impact on learner performance. The same can be said of the results on the third perception statement "We feel we are up to date with covering Mathematics Syllabus" produced a mean rating score of 3.47 out of 5, suggesting that students have a somewhat positive perception of staying up to date with the Mathematics syllabus. Discussion with a principal of low performing school in Mathematics had this to say;

> *"Even though I have consistently created structured engagement with the Mathematics teachers and learners the impact has been minimal improvement in performance. This is consequent upon inadequate learning infrastructure to support teaching and learning Mathematics leaving teachers and learners disillusioned. However, we have tried to reverse this by improvisation of materials which remain inadequate for accelerated performance in Mathematics".*

The standard deviation (1.397) indicates some variability in responses, with a range of opinions among students. The skewness value of -0.489 and kurtosis value of -0.972 indicates that the distribution of responses was negatively skewed with majority of responses clustered around the mean.

The results imply that feeling up to date with the Mathematics syllabus is crucial for student learning and academic progress. When students feel that they are on track with the course content, they are more likely to have a clear understanding of the subject matter and be better prepared for assessments (Lee, 2019).

The regression equation for the objectiveon instructional management and performance is presented as follows;

$$Y=\beta_0+\beta_4X_1+ \beta_4 X_2+ \beta_4X_3+ \varepsilon \quad \ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Where β_0 represents the intercept (learner performance), β_4X_1, β_4X_2 and β_4X_3 denote coefficients quantifying the impact of testing as teaching, instructional supervision and syllabus coverage attributes on learner performance in Mathematics, and ε denotes the error term accounting for unexplained variability.

The model summary results are presented in Table 6;

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.485[a]	.235	.203	.38196
a. Predictors: (Constant), Syllabus Coverage, Testing as Teaching, Instructional Supervision				

Table 6 displayed that the value of R was 0.485, indicating a moderate positive correlation between instructional resources and learner performance. Furthermore, R Square was 0.235, indicating that approximately 23.5% of the variance in learner performance could be accounted for by the instructional resources included in the model.

The Adjusted R Square was 0.203, suggesting that after adjusting for the number of predictors; approximately 20.3% of the variance in learner performance was explained by instructional resources. The SEE was 0.38196, which meant that, on average, the actual learner performance in Mathematics deviated from the predicted values by approximately 0.38196 units. Conversely, the results suggested that instructional resources, as represented by Syllabus Coverage, Testing as Teaching, and Instructional Supervision, collectively explained a moderate proportion of the variance in learner performance in Mathematics, as other factors not included in the model also influenced learner performance.

The results of the ANOVA were shown in table 39.

Table 7: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.233	3	1.078	7.386	.000[b]
	Residual	10.504	72	.146		
	Total	13.737	75			

a. Dependent Variable: Learner Performance in Mathematics

b. Predictors: (Constant), Syllabus Coverage, Testing as Teaching, Instructional Supervision

Table 7 indicates that the regression model had statistical significance ($p < 0.001$) with an F-statistic of 7.386. This suggests that the regression model, which includes predictors such as syllabus coverage, testing as teaching, instructional supervision, significantly explains the variability in the dependent variable, denoted leaner performance in Mathematics. Specifically, the regression component of the model accounts for 3.233 units of variability in learner performance, as indicated by the regression sum of squares. The residual sum of squares, representing unexplained variability in the model, is 10.504. The model's ability to predict learner performance is further supported by the mean square values, which provide an average measure of variability explained by the regression (1.078) and unexplained by the model (0.146).

The coefficient table is presented in Table 8;

Table 8: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.014	.359		-.039	.969
	Testing as Teaching	.281	.071	.461	3.973	.000
	Instructional Supervision	.158	.076	.251	2.075	.042
	Syllabus Coverage	-.132	.091	-.193	-1.455	.150

a. Dependent Variable: Learner Performance in Mathematics

The table results indicate that the constant term was -0.014. This indicates the predicted value of the dependent variable (Learner Performance in Mathematics) when all independent variables are zero. The predictor variable, Testing as Teaching, generated an unstandardized coefficient value of 0.281, indicating that for each one-unit increase in Testing as Teaching, there is a predicted increase of .281 units in learner performance in

Mathematics. This coefficient is statistically significant (Sig. = .000 at 95% CI), suggesting that Testing as Teaching has a meaningful positive impact on learner performance. Additionally, the second predictor variable of instructional supervision, yielded an unstandardized coefficient for Instructional Supervision is .158, indicating that for each one-unit increase in Instructional Supervision, there is a predicted increase of .158 units in learner performance in Mathematics. This coefficient is statistically significant (Sig. = .042 at 95% CI), suggesting that Instructional Supervision also has a meaningful positive impact on learner performance. On the contrary, the predictor variable, Syllabus Coverage, produced an unstandardized coefficient of -0.132, indicating that for each one-unit increase in Syllabus Coverage, there is a predicted decrease of .132 units in learner performance in Mathematics. However, this coefficient is not statistically significant (Sig. = .150), suggesting that Syllabus Coverage may not have a meaningful impact on learner performance. Based on the analysis, the linear regression model may be summarized as:

Learner Performance in Mathematics = -.014 + 0.281(Testing as Teaching) + .158 (Instructional Supervision) – 0.132 (Syllabus Coverage) + 0.707

As a regard, the study null hypothesis postulated as

"Ho1. *There is no statistically significant relationship between instructional management and learner performance in Mathematics in public secondary schools in Nyandarua County, Kenya."*

The result was rejected for being untrue as two components of instructional resources (testing as teaching and instructional supervision) were found to be significantly associated with learner performance in Mathematics at 95% CI. In this regard, the regression model provides evidence that instructional resources play a significant role in predicting learner performance, with testing for teaching and instructional supervision standing out as most significant in enhancing learner performance in Mathematics.

Conclusion

The analysis reveals that teachers primarily utilize testing as a strategy to generate learner interest in Mathematics and management of testing results is employed as a tool for learning improvement. More still, teachers reported that enhanced instructional supervision through personalized approaches such as knowing learners by their names and demonstrating flexibility in pedagogical approaches is critical in improving learning performance in Mathematics. Furthermore, Mathematics teachers employ diverse methodologies and acknowledged the encouraging school routine across Nyandarua County to enhance syllabus coverage. In relation to learner perceptions, majority had generally positive sentiment regarding teaching as testing resulting into comfort and reduced anxiety among as Mathematics tests approach.

Secondly, students expressed a moderately positive perception regarding Mathematics teacher knowing them by name during lessons. Efforts are needed to ensure all students experience this personal connection. Building stronger teacher-learner relationships over time is essential to alleviate anxiety and enhance academic performance, as highlighted by prior studies.

Similarly, students reported a somewhat positive perception regarding staying up to date with the Mathematics syllabus. Addressing variability in these perceptions and ensuring all students feel supported and recognized are essential steps towards fostering a positive learning environment. Furthermore, Mathematics teachers employ diverse methodologies and acknowledge the encouraging school routine, indicating a proactive approach to enhance syllabus coverage. The adoption of varied teaching methods and a supportive school environment reflects a commitment to cater to diverse learning needs and optimize learning opportunities in Mathematics. Learners generally exhibit positive sentiment towards teaching as testing, suggesting reduced anxiety and increased comfort levels as Mathematics tests approach. However, efforts are needed to ensure all students feel recognized and known by their teacher, highlighting the importance of building strong teacher-learner relationships to alleviate anxiety and enhance academic performance in Mathematics. Students report a somewhat positive perception -about staying up to date with the Mathematics syllabus. While the majority feel current with the syllabus, variability in responses indicates the need to address differing opinions among students. Ensuring students feel supported and recognized is crucial for fostering a positive learning environment conducive to academic success in Mathematics.

RECOMMENDATIONS

To strengthen testing as teaching as instructional approach, MOE may revise instructional management policy and supervision, while KICD integrates emerging instructional approaches in curriculum, and CEMASTEA to reinforce class pedagogy through in servicing for improved learner performance in Mathematics. On further research, exploring the position of syllabus coverage as a component of instructional management in facilitating mastery of Mathematics content for better learner performance in Nyandarua County and beyond, could be investigated.

REFERENCES

1. Bayar, A., & Karaduman, H. A. (2021). The Effects of school culture on students' academic achievements. ***Shanlax International Journal of Education,*** 9(3), 99-109.
2. Charalambous, C. Y., & Litke, E. (2018). Studying instructional quality by using a content- specific lens: The case of the mathematical quality of instruction framework. ZDM– Mathematics Education, 50(3), 445–460.
3. Escalona, D. (2019). ***Your voice: Culture is not static and unchanging, let's celebrate that.*** Chicago Tribune.
4. Hoeg, D. G., & Bencze, J. L. (2017). Values underpinning STEM education in the USA: An analysis of the Next Generation Science Standards. *Science Education*, *101*(2), 278-301.
5. Huber, S., Tulowitzki, P., & Hameyer, U. (2017). School leadership and curriculum: German perspectives. Leadership and Policy in Schools, 16(2), 272–302
6. Ifeanyi A, Anyamene A and Nwokolo C (2015): Effects of systematic desensitization technique on test anxiety among secondary school students. *International Journal of Humanities Social Sciences and Education* (IJHSSE) Volume 2, Issue 2, February 2015, PP 167-178
7. König J, Blömeke S, Jentsch A, Schlesinger L, Felske N C, Musekamp F & Kaiser G (2021): The links between pedagogical competence, instructional quality, and mathematics achievement in the lower secondary classroom. Educational Studies in Mathematics (2021) 107:189–212 https://doi.org/10.1007/s10649-020-10021-0
8. Lee, Y. (2019). Academic Learning achievement. Retrieved from https://Avww.quora.com/ What____is academic-learning achievement? [12]
9. Mahdi, O. R. and Almsafir, M. K. (2014). The role of strategic leadership in building sustainable competitive advantage in the academic environment. *Procedia - Social and Behavioral Sciences*, 129, 289-296. https://doi.Org/10.1016/j.sbspro.2014.03.679
10. Moolman, B., Essop, R., Makoae, M., Swartz, S, and Solomon, J.P. (2020). School climate, an enabling factor in an effective peer education environment: Lessons from schools in South Africa. *South African Journal of Education*, Volume 40, Number 1, February 2020
11. Namunga, N. W. (2017): Effect of Supervision of instructional practices on teaching and learning in secondary schools in Kenya. *International Journal of Scientific and Research Publications*, Volume 7, Issue 2, February 2017.
12. Nugroho, K. Y. (2017). Constructivist learning paradigm as the basis on learning model development. *Journal of Education and Learning* (EduLearn), 11(4), 410-415.
13. Nwankwo C. A, Obi J. S & Obi, I. (2014). Effects of study skills technique in reducing test anxiety among secondary school adolescents in Anambra State. *General Studies On Education, Science and Public Issues In Africa*, 4(1)
14. Odeyemi-Bsd, B. S. D. (2020). "Grade 9 learners' perceptions of factors influencing their academic performance in mathematics in Tshwane Municipality, South Africa."DEd thesis in Psychology of Education. University of South Africa. UNISA Dissertation Repository, South Africa.
15. Oyewole, B.K., & Ehinola, G.B. (2014). Relevance of instructional supervision in the achievement of effective learning in Nigerian Secondary Schools. Semantic Scholar. Retrieved March 12, 2023, from https://www.semanticscholar.org
16. Oyier, C. R., Odundo, P. A., Ngaruiya, B., & Mwangi, J. (2017). Science Teachers and Budget Planning for instructional resources in secondary schools in Nairobi, Kenya. *Asian Education Studies*, 2(3), 29. https://doi.org/10.20849/aes.v2i3.198
17. Özdemir, Servet (2012). "The Relationship between School Culture and Organizational Health in Primary Schools." Educational Administration: Theory and Practice, vol. 18, no. 4, 2012
18. Raufelder, D., Regner, N., & Wood, M. A. (2018). Test anxiety and learned helplessness is moderated by student perceptions of teacher motivational

support. *Educational Psychology*, *38*(1), 54-74.

19. Remillard, J., & Bryans, M. (2004). Teachers' orientations towards mathematics curriculum materials: Implications for teacher learning. *Journal for Research in Mathematics Education*, 35(5), 352-388. (n.d.). Retrieved March 12, 2023, from http://www.sciepub.com/reference/106709
20. Schlesinger, L., Jentsch, A. Theoretical and methodological challenges in measuring instructional quality in mathematics education using classroom observations. *ZDM Mathematics Education* **48**, 29–40 (2016). https://doi.org/10.1007/s11858-016-0765-0
21. Schoenfeld A H (2013). Classroom observations in theory and practice ZDM Mathematics Education (2013) 45:607–621 DOI 10.1007/s11858-012-0483-1
22. Thevenin, M. K., Elliott, J. W., & Bigelow, B. F. (2016). Mentors, role models, and observed differences in students' construction education self-efficacy and motivation. *International Journal of Construction Education and Research*, *12*(3), 162-178.
23. Tinungki G N (2019): Zone Proximal Development Gives A New Meaning To The Students' Intelligence In Statistical Method Lesson. Journal of Honai Math, Vol. 2, No. 2, pp. 129-142, Oktober 2019
24. Tong C (2019): Statistical inference enables bad science; statistical thinking enables good science. *The American Statistician*, 73:sup1, 246-261;
25. Watene, D. N. A. A. (2021). Perceptions of education stakeholders regarding influence of principals' strategic leadership practices on performance in Kenya Certificate Of Secondary Education Examinations in Public Secondary Schools, Nyandarua County, Kenya.