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ASSESS THE INFLUENCE OF PUPILS' TALK ON STUDENTS' ACHIEVEMENT OF MATHEMATICS IN PUBLIC SECONDARY SCHOOLS IN MUTOMO SUB COUNTY, KITUI COUNTY

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ABSTRACT

Mathematics has consistently recorded the lowest mean as compared to other subject a problem acknowledged across the world not just in Kenya only. Hence the study endeavored to assess the influence of direct Teacher talk on student's achievement of mathematics in public secondary schools in Mutomo Sub County, Kitui County. The study used mixed methods and concurrent triangulation. The study targeted 20 schools, Education Officer, 60 mathematics teachers and 5102 students. Primary data came from questionnaires, achievement exams, and class observations. Pursuing objectives, qualitative data was evaluated thematically. Quantitative data was analyzed using percentages, standard deviation, mean, and multiple regressions with aid of SPSS V.23. Data was presented using frequency distribution tables and charts. Findings revealed that Pupil talk, primarily initiated by students, was prevalent (24%) after teacher talk in the study. Teachers emphasized immediate correction during pupil talk for enhanced learning outcomes. Results showed a strong positive correlation ($r=0.017$, $p=0.751$) between pupils' talk and achievement, statistically significant at $\alpha=0.05$.

KEYWORDS: Pupils' Talk, Achievement of Mathematics, Public Secondary Schools

1. INTRODUCTION

Teachers play a critical role in student learning and Achievement. However, how teachers instruct and their interactions with students are the cornerstone around students' academic Achievement. This is because classroom communication is a vital ingredient in the instructional and learning process in the classroom. Thus, to facilitate the process of knowledge transmission, teachers should apply appropriate teaching methods that best suit specific objectives and level exit outcomes. Initially, many teaching practitioners widely applied teacher-centered methods to impart knowledge to learner's comparative to student-centered methods. Until today, questions about the effectiveness of teaching methods on student learning have consistently raised considerable interest in the thematic field of educational research (Hightower et al., 2011).

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In Africa, mathematics has been given a very prestigious position in school curriculum. However, most countries have presented the extent of the problem in mathematics in their annual education reports. In Somalia, for example, the problem of secondary school students 'poor Achievement in mathematics has persisted for a long time (Nur, 2010). Some factors have been associated to this phenomenon in other countries in Africa. For example, South Africa needs to train 20,000 teachers a year if they are to avoid an education crisis. However, research indicates that only 9,000 teachers a year are currently graduating '(Adler et al., 2007). In Zambia, the problem was associated to the retention of mathematics teachers. This has been particularly so with regard to rural schools where many teachers refuse to be posted to avoid enduring the unfavorable working conditions.

In Kenya, efforts to enhance the effectiveness of mathematics education have included making mathematics a compulsory subject during the formative years of education (Miheso 2002). Wasiche (2006) observes that in Kenya, mathematics enjoys a special status in the school curriculum by being one of the core subjects and that more lessons of mathematics are taught in schools than science. Despite that, students' Achievement remains very low. This has been causing an outcry from mathematics teachers, mathematics educators, parents, and students for over decades now. According to Cheseto, et al., (2020), school Achievement in mathematics in Kenya has been poor as can be seen in students' Achievement in KCSE. In KCSE examinations, the mean score marks of the candidates have been consistently below 18%.

The dismal Achievement in Mathematics subject in Mutomo Sub – County and Kitui County at large has been attributed to a number of factors like social background factors, competitive structured classrooms which raise the level of anxiety and stress while learning mathematics and specialized mathematical (Chikoyo, 2023). The quality of text books, negative attitude towards mathematics have been viewed as possible factors responsible for dismal Achievement (Chikoyo, 2023). Table 1 below shows the mathematics mean scores for the years 2012 - 2016.

Table 1: Mean Scores Mathematics from KCSE Results: 2012-2016

Year	Candidates	Mean Scores
2016	178,607	16.24
2015	193,702	18.72
2014	197,118	19.70
2013	101,500	20.12
2012	115,600	21.65

Source: (KNEC, 2017)

Table 1shows that students' Achievement in mathematics in Kenya for the five years presented was below average. However, Morris and Arore (1992) contend that the problem of students' poor

Achievement in mathematics is not confined to any one country but universal. In response to this global problem, researchers in various countries investigated its root causes

It was against this background that the researcher aimed to analyze the influence of Flanders' interaction analysis categories systems on students' Achievement in mathematics in public secondary schools in Mutomo Sub County, Kitui County

2. STATEMENT OF THE PROBLEM

Students' poor Achievement in mathematics is the major problem facing secondary schools in Mutomo Sub County. The mean mark of mathematics was very low and given the fact it is a compulsory subject in secondary schools raises a lot of concerns. The methods used by teachers to teach had been related to this poor Achievement (Kitavi, 2016). A growing body of research in classrooms has demonstrated that teachers do make a tangible difference in student Achievement (Vescio*et al.* 2008). Karuri, (2015) carried out research on the factors affecting mathematics Achievement among secondary school students in Nairobi Province, Kenya, while Wasiche (2006) conducted research on the teaching techniques that enhance students 'Achievement in mathematics in selected public secondary schools in Butere-Mumias Sub County in Kenya.

Based on the previous research, there was no systematic research addressing the influence of Flanders' interaction analysis categories systems on students' Achievement in mathematics in public secondary schools carried out in Kitui County in general and Mutomo Sub County in particular. It was view of this gap that the researcher aimed to analyze the influence of Flanders' interaction analysis categories systems on students' Achievement in mathematics in public secondary schools in Mutomo Sub County, Kitui County

3. OBJECTIVE OF THE STUDY

To assess the influence of pupils, talk on students' Achievement of mathematics in public secondary schools in Mutomo Sub County, Kitui County

4. SIGNIFICANCE OF THE STUDY

i. The findings will further sensitize educational administrators to harmonize curriculum for teaching institutions and teaching policies.
ii. The findings will provide Mathematics teachers guidance on the selection of suitable methods and resources for teaching and learning mathematics.
iii. Future researchers interested on the Flanders' interaction analysis categories systems or students' Achievement in mathematics will use this study as the basis for further study in mathematics education.

5. LITERATURE REVIEW

As indicated by Flanders' hypothesis, this collaboration design incorporates the eighth and ninth classification of the FIACs. It contains students talk in light of educators talk or inquiries. It includes the educator starting the discussion and afterward enabling the students to take part accordingly.

Numerous researchers today generally embrace this technique to improve dynamic learning (Greitzer, 2012). Most educators apply the way to deal with advance intrigue, scientific research, basic reasoning and satisfaction among students (Hesson& Shad, 2012). The strategy is respected more viable since it doesn't incorporate the stream of learning from the speaker to the understudy (Lindquist, 2015). The approach likewise propels objective orientated conduct among students, subsequently the technique is exceptionally viable in enhancing understudy Achievement (Slavin, 2014).

Flanders (1970) examined the impacts of FIACS input on the verbal practices of instructors and found that educators who got criticism were found to utilize more acclaim, acknowledge and elucidate understudy thoughts more, utilize more backhanded talk, utilize more uplifting feedback after educator started understudy talk, utilize less remedial input, censure students less, make more inquiries, utilize less address strategy, give less bearings and less instructor started talk.

Concentrates by Kline and Sorge (1974), Younger, Warrington, and Williams (1999) have demonstrated that even instructors who were not prepared in the mechanics of collaboration investigation will change their classroom verbal practices because of input from the connection examination. Discoveries from Swann and Graddol (1988), and Younger and Warrington (1996) have inferred that educators' classroom verbal practices could influence essentially essential students Achievement in science and their disposition towards the subject.

As per Ahmad and Aziz, (2013), a few instructors receive students' discussion, in which their part is limited to help of the educating procedure. Students' discussion is related with innovative, basic and inventive aptitudes; dynamic investment of students in the learning procedure through discourses and scholarly commitment; and additionally higher learning Achievement and viability in tending to issues of mankind (Ministry of Education, 2001; Dufresne, et al., 2010). In spite of the fact that educators have the attentiveness to pick strategies for conveying lessons to their students, Chika (2012) observes that students' discussion is an effective procedure for enhancing learning Achievement in examinations and utilization of information and aptitudes gained in Mathematics. Likewise, scientists have related exercises like; remembrance of exchanges, question and answer hone, substitution drills and different types of guided talking with students' discussion with accentuation being on packing precise articulation and composing (Richards, 2006). For this situation, educator is constantly precise and if students are permitted to make mistakes, the blunders would rapidly turn out to be a piece of the students' discourse. Nonetheless, scientists (Doherty &Hilberg, 2008; Cummins, 2007; Kumar, 2006) expressed that students may effortlessly overlook and flop in the examinations in the event that they are not permitted to take part completely by giving their assessments. In light of the writing over, the principal target of the present examination will center around the impact of students' discussion on students Achievement in Mathematics.

As indicated by the FIACs hypothesis, students' talk-start is the ninth class of FIACs hypothesis. At this class, Flanders illustrated that student's start talk like communicating their own thoughts, starting new theme, make astute inquiries or notwithstanding going past the current structure. Past scientist

expressed that, at this classification it is vital to consider the information and encounters that the student conveys to the learning assignments (Commins, 2007). Commins additionally contends that an educator can compose students to have debating session of little gatherings of students and pick one of the students to be the mediator of the session in the class.

As indicated by Flanders hypothesis, instructor should choose the territory of dialog and afterward designate distinctive gatherings of students to take a shot at it and later present their assessments and along these lines taking into account students- talk activity. Also, amid introductions one understudy may raise a few issues that will in the end incite more classroom dialog. In view of the social constructivism hypothesis of learning, students- talk activity includes encouraging the introduction of inquiries for little gathering function and the accumulation of students' answers and the show of histograms indicating how the class replied (Kang'ahi et al., 2012). It was vital to utilize Flanders Interaction Analysis Categories hypothesis to discover how ninth class of FIACs hypothesis impacts students Achievement in Mathematics.

6. THEORETICAL FRAMEWORK

Social Constructive Theory

Social Constructive Theory is under social learning theories formulated by Vygotsky (1962) and is important for this study because it views the teacher as a source of authority in the teaching-learning process. The theory views the student as an active participant in teaching-learning process, and that the role of the teacher is to facilitate him so that he can construct knowledge for himself depending on the available resources and the environment. According to this theory, when children are tested on tasks on their own, they rarely do as well as when they are working in collaboration with an adult (teacher). The process of engagement with an adult (teacher) enables the children to refine their thinking or their Achievement to make it more effective. The researcher will use this theory to observe the activities of the teacher during teaching-learning process in relation to the ten interaction categories advanced by Ned Flanders 1970.

7. METHODOLOGY

The study adopted a mixed methodology, combining both qualitative and quantitative approaches. The approach was favored since it provides the research with many designs which involve a range of sequential and concurrent strategies. The study particularly adopted concurrent triangulation design. The design enabled the researcher to collect qualitative and quantitative data followed by integration which strengthened knowledge claims. The study was carried out in Mutomo Sub County, Kitui County. Mutomo Sub-County, at the time of the study had 20 public secondary schools and students' enrollment of 5102. Study target population consisted of 20 public secondary schools from which 60 mathematics teachers and 5102 students were drawn. The distribution of target population is presented table 2.

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Table 1: Target Population

School category	Number of School	Students	Mathematics teachers
Boys Boarding	5	1202	20
Mixed Boarding	2	930	8
Girls Boarding	6	920	25
Day Mixed	7	2050	30
TOTAL	20	5102	83

The researcher sampled 5 schools which was 25% of the total number of public secondary schools in Mutomo Sub County. This was arrived at by applying Mugenda & Mugenda (2008) rule that, a sample of 10 to 30% of the populations is sufficient for and representative of population of interest. Proportionate sampling method was further applied to get sample size for schools and students as presented in table 3.

Table 2: Sampling grid

School category	Number of School	Proportionate Sample	Proportionate Sample (20%)	Sample Size	Mathematics Teachers	Students
Boys Boarding	5	5/20×5 = 1	25	1	4	20
Mixed Boarding	2	5/20×2 = 1	10	1	4	40
Girls Boarding	6	5/20×6 = 1	30	1	4	20
Day Mixed	7	5/20×7 = 2	35	2	8	80
4	20	5/20×20= 5	100	5	20	160

The investigator applied simple random sample methods in selection of the 5 schools to minimize bias and increases chances of participation in the study by all schools. In each school selected, mathematics teachers in each form were purposively selected and in cases where there were two streams or more with different mathematics teachers, one teacher was randomly selected. This was a total of 4 mathematics teachers in each sampled school. Selection of students in single schools (i.e. boys boarding and girls boarding) was done through simple random techniques to select 5 students in each form (excluding form ones). The students wrote their names in pieces of paper and folded them and then researcher selected 5 in each form without replacement. In mixed day secondary schools and mixed boarding schools 10 students (5 girls and 5 boys) were selected from each sampled schools by simple random sampling. All the students were also asked to write their names on provided pieces of papers and to fold them.

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The study utilized three types of instruments namely; Mathematics Teacher' Questionnaire which focused on FIACs application in teaching and learning. Class Observation Schedule was administered to record verbal behavior or events of the teacher in classroom. And lastly, learners' achievement test, which comprised of a 50 marks achievement test to determine their achievement in relation to the classroom interaction procedures.

A pilot study was conducted in Kitui Central Sub-County involving two schools. Pilot results were vital in fine tuning the research instruments to ensure validity and reliability of the instruments. Research utilized mixed method approach in analysis of data, combining qualitative and quantitative approaches. That quantitative approach comprised of descriptive statistics and inferential statistics. On the other hand, qualitative data was analyzed through descriptive statists consisting of percentages, means and standard deviation.

8. RESULTS AND DISCUSSION

Influence of pupils-talk on learner's achievement in Mathematics subject

The third objective sought to establish the influence of pupils talk on learner's achievement. In order to achieve this objective, researcher first analyzed the teacher's response on the use of pupils talk and then used the student's achievement test to compare the performance of the students with the teacher's response on pupils talk category using a correlation analysis. Initially the researcher applied the FIAC's analysis category system to arrive at his results. This was computed as follows.

Table 3: Extent to which Mathematics teachers agreed or disagree with the statements on the influence of pupils' talk

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
Learners answer my questions orally either as a whole class or individually	(40) 100%	-	-	-	-
I organize students into groups for discussion and debates	(38) 95%	(2) 5%	-	-	-
Learners get high scores when they learn by interacting with the teacher	(37) 93%	(3) 7%	-	-	-
Learners score better when I correct them immediately they make a mistake to avoid negative learning	(39) 98%	(1) 2%	-	-	-

Table 4 shows that majority of the Mathematics teachers (85.71%) strongly agreed that learners answered their questions orally either as a whole class or individually. 57.14 of the Mathematics teachers were not sure on whether they organized students into groups for discussion and debates whereas 42.85% agreed that did. 42.85% agreed and 28.57% of the teachers agreed that learners got

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high scores when they learned by interacting with the teacher. Majority of the Mathematics teachers (57.14%) who applied pupils talk argued that learners scored better when corrected immediately they make a mistake to avoid negative learning. These findings concurred with the 8th and 9th category of the FIACs theory that involves pupils talk in response to teachers talk or questions.

The Heads of Department – mathematics argued that teachers were giving students more time than themselves during teaching – learning process. In the classroom, the researcher observed that pupils were initiating talk by expressing their own ideas, initiating new topic, asking thoughtful questions rand some students were even going beyond the existing structure. These observations were in line with Commins (2007), who comments that it is paramount to first consider the knowledge and experiences that the learner brings to the learning tasks.

According to heads of department – Mathematics, Mathematics teacher organized students to have a task session of small groups of students and teacher chose the topic of discussion in which later they presented their views. This condition allowed for students'-talk initiative. These findings were in line with Kang'ahi*et al* (2012) who argue that pupils' talk initiative involves facilitating the presentation of questions for small group work as well as the collection of students' answers and the display of histograms showing how the class answered.

It was found that teachers were using pupils talk frequently and their response on pupil's talk was used in comparison to student's achievement. In order to compare the student's achievement in the test, a correlation analysis was done and the findings were presented in Table 24below;

Table 4: Percentages of Learners under Pupil's Talk's Categories

		f	%
Valid	Category 8	204	56.0
	Category 9	160	44.0
	Total	364	100.0

Source: (Field data, 2018)

Table 5 shows the valid percentages of the specific categories of the Pupil's Talk on the learner's achievement. From the table, 204 learners representing 56% of the PT were under the category 8 of FIAC'S while 160 learners representing 44% were under category 9.

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Table 5: Descriptive Statistics of the Pupil's Talk on Learners' Achievement

	N	Minimum	Maximum	Mean	Std. Deviation
Pupil talk	364	8.00	9.00	8.4396	.49702
Learners achievement	364	54.00	99.00	79.5659	12.10257
Valid N (list wise)	364				

From Table 6, the mean performance of the learners in Mathematics subject under the exposure of the various FIAC'S categories in PT was 79.56%. This is deemed excellent as the performance is far away from the average mark of 50. Also, the mean of the teachers who concentrate on applying the PT categories was found to be 8.43. This mean is considered high and commendable in comparison to the total number of teachers (40) who were used for the study.

Table 6: Relationship between pupils talk and students' achievement in mathematics

		Pupil talk	**Learners' achievement**
Pupil talk	Pearson Correlation	1	.017
	Sig. (2-tailed)		.751
	N	364	364
Learners' achievement	Pearson Correlation	.017	1
	Sig. (2-tailed)	.751	
	N	364	364

From Table 7, shows that there was strong positive relationship between pupils talk and student's achievement in mathematics (364) = 0.017, ℓ=0.751, at α=0.05}. However, the relationship is statistically significant. The Pearson Product Moment Correlation Coefficient for a (2 tailed test) is given 0.017 at 0.05 level of significance and p-value of 0.751. Since the value of the Pearson Correlation is less than the p-values (0.751) it is considered statistically significant. In this regard therefore, it true to conclude that the pupil's talk had a very great positive impact on the learners' achievement as seen by the value of the Pearson Correlation and the mean mark of 79.56% that was realized.

Table 7: PT categories make the learners achieve the highest in Mathematics subject.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.017[a]	.000	-.002	12.11759	.000	.101	1	362	.751

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a. Predictors: (Constant), PUPIL TALK

From this table8, the value of R squared which is the coefficient of determination also tells us to what extent the variation of the PT categories has on the learner's achievement. The R squared value is 0.000 at 95% confidence interval and the value of the adjusted R is -0.002. This means that the PT categories influence on the learners' achievement is negligible and does not in any way affect the learners' achievement negatively. The notable negative percentage of influence is -0.00% which approximately equal to 0. This is the main reason as to why the learners' achievement in these particular categories is very high.

From the interview sessions, all the 40 Heads of Departments interviewed gave a positive feedback that the pupils talk was the best FIAC's method to be used in the teaching-learning process. Their responses represented 100%. The researcher also established that there was a strong relation that existed between the PT categories and learner's level of achievement. In this regard he also performed the regression analysis given by the equation Y= a + b X where Y was the level of learner's achievement and X corresponded to the ITT categories which was the independent variable, b is the regression coefficient and this case it was found to be 0.17 at 0.751 significant change. This tells us that that the PT categories positively influenced the learner's achievement by a great extent by 75% thus realizing a very high mean score of 79.56%.

Table 8: The ANOVA Table for the PT Categories and the Learner's Achievement

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.817	1	14.817	.101	.751[b]
	Residual	53154.601	362	146.836		
	Total	53169.418	363			

a. Dependent Variable: LEARNERS ACHIEVEMENT

b. Predictors: (Constant), PUPIL TALK

Source: (Field data, 2018)

From this analysis, the value of the Fisher's Test (F) is 0.101 at p-value of 0.751 and 0.05 level of significance. This positive value of F which is less than the p-value (0.751) tells us that there is a statistically significant influence of the Pupils' Talk on the achievement of Learners in Mathematics subject. The influence in this case is that the

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Table 9: Table of Coefficients'=76.135+0.406x$_3$+12.11759

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	76.135	10.818		7.038	.000	54.861	97.410
	PUPIL TALK	.406	1.280	.017	.318	.751	-2.110	2.923

a. Dependent Variable: LEARNERS ACHIEVEMENT

Source: (Field data, 2018)

The Table 10 shows that the first value of t is 7.038 at p-value of 0.000 and the second value of t is 0.751 at p-value of 0.75. Since the value of t in the first case is less than the p-value (0.000), this implies that there is a statistically significant influence of the pupil's talk on the learners' achievement. This influence is more positive than the previous categories discussed. The significance realizes a mean mark of 79.56% which is far much higher than the mean marks achieved by the DTT and the ITT categories.

9. CONCLUSION

The results show a connection, between students talking and their math achievements. Teachers mostly agreed that students who actively participated in discussions performed better academically. The study used FIACs analysis categories with student talk being the common category after teacher talk making up 24% of interactions. Specifically, category 8 (students responding to teacher questions) and category (students initiating discussions independently) were notable. A correlation analysis displayed a Pearson correlation coefficient of 0.017 with a p value of 0.751 indicating significance. This suggests a link between student talk and academic success. Moreover, regression analysis demonstrated that student talk positively impacted student achievements by around 75%. The average math achievement score was found to be 79.56% than the typical score of 50%. Teachers focusing on encouraging student participation correlated with student performance. Additionally, the study observed that correcting mistakes promptly during student discussions led to learning outcomes. In summary the results indicate that student conversations play a role, in boosting math achievement. Teachers actively promoting student dialogue along with providing feedback greatly contribute to learning results. The research highlights how crucial it is to encourage student involvement and independence during the learning journey as shown by the link, between student discussions and achievement, in math.

10. RECOMMENDATIONS

Based on these findings, there are some suggestions for the mathematics teacher to realize the importance of the classroom interaction using Flanders Interactive Analysis and to develop teaching skill and method. So, it is better if the teacher not only spends the teaching-learning time by explaining the material. Teacher can organize some activities for the students to make the classroom interaction more effective.

Some Mathematics teachers and Heads of Department were not familiar with Flanders interactive analysis category and therefore the researcher recommends that Mathematics teachers reads and understands the Flanders interactive analysis or go for in-service training.

Since not many Mathematics teachers were using pupil talk, the study recommends that Mathematics teachers should emphasize more on pupils talk to improve student's achievement in Mathematics.

REFERENCES

Adunola, O. M. (2011). an analysis of the relationship between class size and academic performance of students. *Ego Booster Book: Ogun State, Nigeria*.

Applebee, A. N., Adler, M., & Flihan, S. (2007). Interdisciplinary curricula in middle and high school classrooms: Case studies of approaches to curriculum and instruction. *American educational research journal*, *44*(4), 1002-1039.

Chika, O. P. (2012). The Extent of Students' Reponses in the Classroom. *International Journal of Academic Research in Business and Social Sciences*, *2*(1), 301.

Chikoyo, R. (2023). Schools' heads leadership styles in influencing teacher attrition in public secondary schools in Tanzania: The case of Kilimanjaro and Manyara Regions. *Journal of Co-operative and Business Studies (JCBS)*, *5*(2).

Cummins, J. (2007). Rethinking monolingual instructional strategies in multilingual classrooms. *Canadian journal of applied linguistics*, *10*(2), 221-240.

Doherty, R. W., & Hilberg, R. S. (2008). Efficacy of five standards in raising student achievement: Findings from three studies. *The Journal of Educational Research*, *101*(4), 195-206.

Dufresne, A., Hillman, A., Carson, C., & Kramer, T. (2010). Teaching discipline: A toolkit for educators on positive alternatives to out-of-school suspensions. *New Haven, CT: Connecticut Voices for Children*.

Flanders, N. A. (1970). Analyzing teaching behavior.

Flanders, N. A. (1970). Analyzing teaching behavior.

Greitzer, F. L. (2022). Introduction to CITRAP's Inaugural Issue. *Counter-Insider Threat Research and Practice*, *1*(1).

Hightower, A. M., Delgado, R. C., Lloyd, S. C., Wittenstein, R., Sellers, K., & Swanson, C. B. (2011). Improving student learning by supporting quality teaching. *Retrieved on*, *3*, 14.

Kang'ahi, M., Indoshi, F. C., Okwach, T. O., & Osodo, J. (2012). Teaching styles and learners' achievement in Kiswahili language in secondary schools.

Karuri, M. I. C. H. A. E. L., & EDUCATION, M. O. E. I. (2015). Effectiveness of SMASSE program towards enhancement of mathematics' performance in public primary schools in Embakasi District, Nairobi County, Kenya. *Unpublished masters' thesis). Kenyatta University, Nairobi, Kenya*.

Kline, C. E., & Sorge, D. H. (1974). How effective is interaction analysis feedback on the verbal behavior of teachers. *Educational Leadership*, *32*(1), 55-62.

Lindquist, K. A., MacCormack, J. K., & Shablack, H. (2015). The role of language in emotion: Predictions from psychological constructionism. *Frontiers in psychology*, *6*, 121301.

Majiwa, C. O., Njoroge, B., & Cheseto, N. (2020). Influence of constructivism instructional approach on students' achievement in mathematics in secondary schools in Mandera Central Sub County, Kenya. *East African Journal of Education Studies*, *2*(1), 115-128.

Miheso, K. M. (2002). Factors affecting mathematics performance among secondary school students in Nairobi Province, Kenya. *Unpublished M. Ed Thesis, Kenyatta University*.

Morris, R. & Arora, M. S. (1992) Studies in Mathematics Education: Moving into the twenty-first century. Paris: UNESCO

Nur, M. A. (2010). Factors that Influence Secondary School Students 'Performance in Mathematics in Banadir Region, Somalia. *Unpublished Master's thesis, Kenyatta University, Nairobi, Kenya*.

Richards, K. (2006). *Language and professional identity: Aspects of collaborative interaction*. Springer.

Slavin, R. E. (2014). Making cooperative learning powerful. *Educational Leadership*, *72*(2), 22-26.

Swann, J., & Graddol, D. (1988). Gender inequalities in classroom talk. *English in education*, *22*(1), 48-65.

Vescio, V., Ross, D., & Adams, A. (2008). A review of research on the impact of professional learning communities on teaching practice and student learning. *Teaching and Teacher Education, 24(1), 80–91*

Vygotsky, L. S. 1962. *Thought and Language*. Cambridge, MA: MIT Press.

Wasiche, J. L. (2006). Teaching Techniques That Enhance Students Performance in Mathematics in Selected Public secondary schools in Butere-Mumias District. Kenya. *Unpublished M. Ed Thesis. Kenyatta University*.

Younger, M., Warrington, M., & Williams, J. (1999). The gender gap and classroom interactions: reality and rhetoric? *British journal of Sociology of Education*, *20*(3), 325-341.