

To Establish the Effects of Principals' Support to Teachers Through Mathematics Seminars/Workshop on Student' Performance in Mathematics in Kcse Examination in Meru County, Kenya.

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ABSTRACT

Performance in Mathematics in Meru County, Kenya from 2012 to 2016 has consistently been deteriorating. The purpose of this study was an evaluation of how the administrative strategies designed by the principals affected students' performance in the Kenya Certificate of Secondary Education (KCSE) in Meru County. Objectives that directed the study were to evaluate the various attributes on student performance in KCSE examination in Meru County. The objective was to evaluate principal's support to teachers through Mathematics seminars/workshops and student's performance in Mathematics. This study used ex post facto design. The research instrument was Mathematics teachers' questionnaire, KCSE document analysis for five years in Meru County and Principal's interview guide. The target population was 299 principals and 836 Mathematics teachers in the County. This study used stratified random sampling with proportional allocation. The sample size was 30% of the total target population translating to 92 principals and 251 Mathematics teachers. Validity was ensured by piloting the instrument. Reliability was ensured by using split half technique. The findings revealed that principals were not sponsoring Mathematics teachers to attend workshops and seminars.. The principals cited a lack of resources and budgetary allocation to the low number of Mathematics teachers attending seminars and workshops. The findings of the study were expected to be useful to the Ministry of Education, teachers and students as well as other stakeholders in the education sector.

Keywords: Mathematics; KCSE; performance; principals; administrative strategies; evaluation;

Background to the Study

To improve the performance of a school, it is paramount that the principals exercise leadership and acknowledge the fact that the direction of the school is a vision shared by all the stakeholders and ways to make the schools successful are well managed (Malkus, 2010). This therefore means that ensuring the necessary elements to improve students' performance are availed, are working effectively and are geared towards success of students as one of the key roles of the principal (Hill, 2006). With that, the responsibility of overseeing school systems, its processes and even resources and how all these combine to create the purposed learning outcomes for students is conducted by the principal as the chief architect of the school. For achieving in academics, clearly defined goals are set by effective school principals. This means they avail resources and gear operations towards the set goals, provision of the timetable for teaching and routinely check and observe class instructions and even lesson plans. To check the attainment of instructional goals, they monitor progress of students continuously. This will mean they will report back on how the students perform, ensure discipline among students, ensure excellent student performance reinforced, motivate the teachers and capacity build them thus quality teaching-learning processes (Anderson & Nichols, 2007).

To improve student achievement in Mathematics, the teachers and the school administration have to perform evolving instructional administrative roles by applying practitioner-based effective teaching and learning strategies. This means that in order to increase on helping students get it better in Mathematics, one has to understand and select well the different teaching strategies combined, (Mohanty, 2005). The author, Mohanty 2005 continues to add that in schools where multiple changes in learning and activities that affect the daily living of students have shown to have the highest possibility of improving student learning. Such strategies may include introducing training for teachers, use of the learning cycle approach; use of computer simulations; organizing workshops and seminars for Mathematics teachers, organizing remedial classes for weak students, encouraging students to conduct discussions and inviting specialists to talk to students on how to enhance academic performance in Mathematics.

According to Campbell and Malkus (2010), inviting Mathematics specialists may have impacts positively on what the students achieve as time progresses. Mathematics seminars and workshops are among strategies used in teacher's professional development (Garet, 2008). There are different studies to state that professional development affect how the students achieve. Scholars Garet 2008 and Wilson 2009 in their experimental study to examine features of high quality professional development found that the increase in the teacher's knowledge increased the desired practices in the classrooms but this did not mean improvement in student outcomes nor any sustainable changes.

Good performance in students is triggered by availing adequate teaching/learning resources which promote the schools' effectiveness. These are both human and non-human that affect the entire students' performance. Gifted and talented students embrace competitions as echoed by Malkus 2010; Davidson & Riley 2007 and the Ministry of Education (2004) add that competitions form a part of the required continuum of different opportunities. Use of small groups in class to perform different tasks presents positive impact on students learning as evidenced within the Mathematics education. Karnes (2003), made a comparison on how students achieve in Mathematics using small groups and using the whole-class

setting. Olembo, Wanga and Karangu (1992) argue that schools that perform poorly spend limited resources on the purchase of teaching and learning resources. UNESCO (2000) annual report posits that Excellency in academic pursuit is synonymous with mobilization of resources by school managers. A study by Ayot (2002) in Maseno Division showed that in availability of textbooks in learning institutions resulted in poor performance.

It's a global concern how students perform in Mathematics as evidenced in different studies. There is a study in the USA done by American Institute for Research (AIR) to find out how Mathematics perform on 4th and 8th grade students in the USA comparing it with the same graders across the world done by National Assessment of Education progress (NAEP) that the Mathematics students' progress of grade 4, 8 and 12. In their findings, Grade four pupils performed below the average mark from 1996-2007 consistently. African countries such as, Egypt, Tunisia, Morocco, Botswana, Ghana and South Africa participated in The International Trends in Mathematics and Science Study (TIMSS) in 2003. Comparison with TIMSS, 1999 indicated that there was no significant difference in Mathematics scores in this period (TIMSS, 2003). The Mathematics performance was poor between 1999 and 2003.

A report by National Education Commission of Tanzania (NECTA), (2013) presented that performance in Mathematics has been going down. This was similarly shown in the nation Form Four examinations of 2014 where the subject performed poorly compared to other subjects (NECTA, 2014). Programs in Education produce qualified teachers of Mathematics for secondary Schools. However, the general performance in Mathematics among secondary schools' students has been poor for many years Kenya National Examination Council (KNEC, 2006). This has the amplifying effect that Kenya may not achieve goal of industrialization as envisaged in the Vision 2030.

One of the greatest challenges faced by the Kenya education community as seen in the Global Literacy Project of 2008 is the continued downward trend in the performance of Mathematics in secondary schools despite the efforts of Kenyan government prioritizing Mathematics achievement and declaring it in her National Development Plan (2008). Some of the contributors of this poor Mathematics performance in Kenya in secondary schools include poor quality of teaching, the classroom environment being harsh and unfriendly, students lost interest and their negative attitudes and also poor management and administrative strategies. (Eshiwani, 1985; Marete, 2008).

Consortium on Strengthening Mathematics and Science Education (SMASE) of (2009) labeled criticism against teachers for the declining standards in Mathematics in the country. This poor performance is in both Kenya Certificate of Primary Education (KCPE) and Kenya Certificate of Secondary Education (KCSE). However, findings from a study in Murang'a County by Mwagiru (2014) on implementation of SMASE showed that adequate learning and teaching resources had not been availed by head teachers for use in science and Mathematics teaching to ensure implementation of SMASE. She also observed that Mathematics and science teacher is overloaded with high number of pupils per class, more than one subject to teach and heavy workload of lessons to cover per week killing their motivation to implement SMASE INSET. Marete (2012) also concurs, that SMASE approach of teaching and learning science and Mathematics has been partially achieved and implemented. He adds that the SMASE approach was encountering several challenges which were hindering full implementation. There has been great concern over the declining performance in Mathematics which has persisted in the last several years and Meru

County is not an exception. Therefore, this study is expected to address the poor performance in Mathematics in Meru County.

An analysis of the county's Mathematics results from the years 2008 to 2015 shows that performance in Mathematics has been below average of 50% (KNEC, 2015). While as other Counties in the country have consistently performed well in the subject, there is strong reason to believe that there is a problem worth researching on in Meru County. According to UNESCO (2015), the school principals being the people responsible for schools' performance are expected to come up with strategies that will enable their schools to boost performance in Mathematics. This study was set to establish the effects of principals' administrative strategies on Mathematics performance in KCSE among students in Meru County, Kenya.

Statement of the Problem

Up to the secondary level of education in Kenya, Mathematics is a core subject which means all the students have to take it up as one of their study subjects. This is because Mathematics forms the basis of other career fields including engineering, commerce, agriculture, medicine, architecture among others.

Despite the government of Kenya providing free secondary funds and prioritizing Mathematics. Mathematics performance at the secondary school level has continued to decline for the last five years in Meru County, from 2012 to 2016. Mathematics scores have been below average (2.8), which is averaged from the mean obtained between 2012 and 2016, an indication of grade D plain on average. However, in neighboring counties of Tharaka-Nithi and Embu had a mean of 4.5 within the same period, which are grade D+ and 4.91 which is grade C- respectively.

Although several studies have been conducted on the contribution of administrative role of school principals on student performance, there is limited information on evaluation of principals' administrative strategies on student performance in Mathematics and especially in Meru County.

Purpose of the Study

Was an evaluation of effects of principals' administrative strategies on students' performance in Mathematics in Kenya certificate of secondary education in Meru County, Kenya.

Conceptual Framework

Conceptual frame work showing how the variables in the study interrelate i.e the independent, intervening and dependent variables in the study

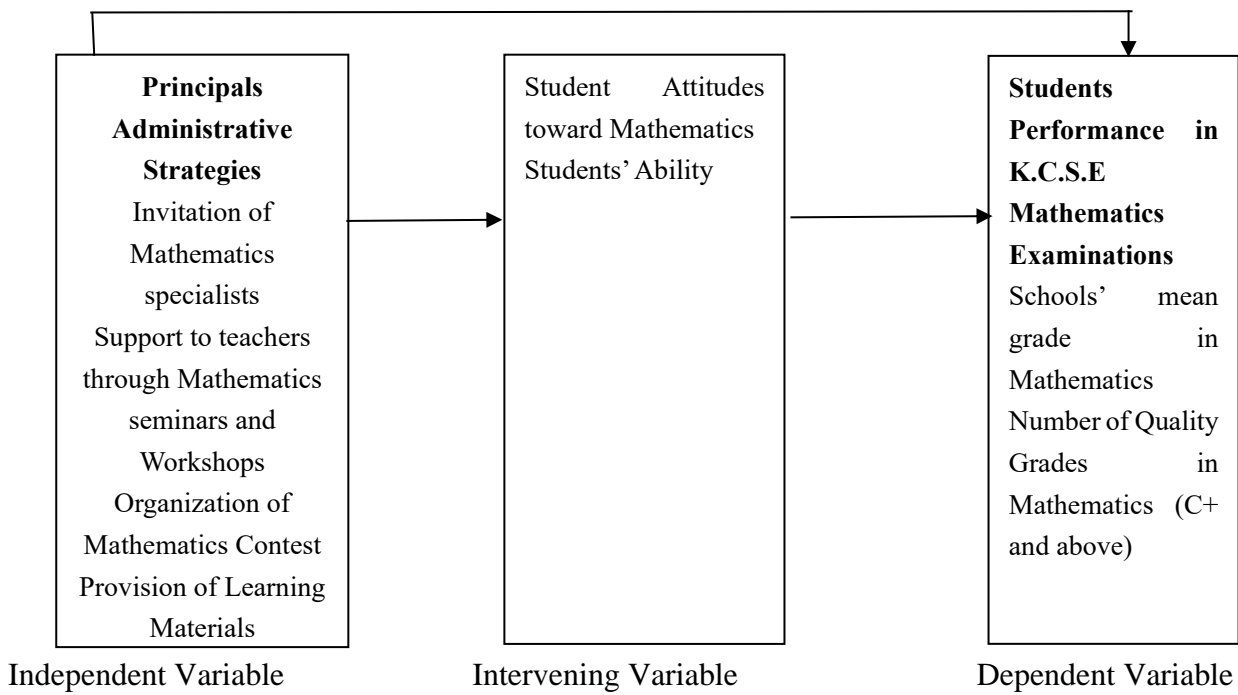


Figure 2.1: Conceptual Framework on strategies used by principals and student’s Mathematical performance.

The researcher’s hypothesis was that there existed a relationship between principals’ administrative strategies and the students’ performance in Mathematics in KCSE examination. However, other variables such as the attitudes of learners towards Mathematics were also likely to affect their performance in KCSE examinations.

The researcher’s assumption was that the students’ attitudes towards Mathematics as a subject and their ability have no significant effects on the relationship between principals’ administrative strategies and students’ performance in Mathematics in KCSE examination since those students had performed in their KCPE in order to be admitted to those secondary schools. To control student attitude towards Mathematics, the researcher divided the students into two groups. The experimental and control group. The researcher administered the test to the two groups and manipulated the results of the experimental group. If the results were 40% and below, the researcher rejected the null hypothesis that there was no significant relationship between principals’ administrative strategies and students’ performance in Mathematics in KCSE examination. Workshops and seminars attended by Mathematics teachers would help them to sharpen their skills and competencies and therefore support from the school principals for those teachers who went for in service courses and workshops would ultimately affect academic performance of the subject in examinations.

RESEARCH METHODOLOGY

Research Design

This study used ex-post facto design because the variables under investigation had already occurred (Creswell, 2013). Therefore, in this study the researcher was not able to manipulate the independent

variables in order to get their impact on dependent variables because their effect had already occurred. Additionally, in this case there were no two groups, the control group and the experimental group.

Target Population

This study targeted a population of 299 principals and 836 Mathematics teachers in secondary schools in Meru County. In this study, a classification of the schools in terms of gender mixed schools (211), Girls' schools (54) and Boys' schools (34) was done.

Sample Size and Sampling Procedures

On determining the sample size, Mugenda & Mugenda (2003) state that depending on time and resources available, a 10% sample can be used for a large population is studied more than 1000 while for smaller populations, less than 100, 30% sample be used. This study therefore used 30% of 299 principals and 836 Mathematics teachers translating to 92 and 251 sample size, respectively. This will ensure that the number of schools per category are a good representative of the population and hence increase the precision (Creswell, 2013). For selecting schools in the different categories, stratified random sampling with proportional allocation was employed. The method will ensure that the characteristics of the three sub-groups are represented. In each category, the researcher employed simple random sampling to determine the specific school that was visited. The same procedure applied to identification of respondents.

Table 3.1: Number of Schools Visited per each Category

Mixed Schools	Girls' Schools	Boys Schools	Total Number
64	17	11	92

Research Instruments

The research instruments that aided in conducting this study were:

- i. Mathematics Teachers' questionnaire
- ii. Document analysis
- iii. Principal's Interview guide

All the instruments were developed by the researcher.

Piloting Instruments

To ascertain the validity and reliability of the data collection questionnaires, pilot survey was conducted. Pilot test assisted in establishing any flaws, weaknesses and limitations seen in the interview design that were there and gave room for the adjustments to be made before the actual study implementation (Kvale, 2008).

The pilot testing of the data collection tools not only ensured the questions flow or make sense but also to improve the functioning of the tool in general (Creswell, 2003). A selection of 10 schools was chosen to take part in the pilot study for this study, three schools from each of school category. The findings of the piloting of the research instruments was used to fine tune and enhance the efficacy of data collection tools to collect adequate and sufficient data to enable the study to achieve the research objectives exhaustively.

Validity of Research Instruments

The degree to which the results analyzed from the data collected actually represent the phenomenon being investigated is called validity, (Orodho, 2009). It describes whether an instrument captures the intended information it was designed for. Expert judgement and review was used to enhance content validity of the data collection tools (Kumar, 2009). The instruments were prepared with close consultation from the supervisors by the researcher order to ensure that the questionnaires cover all the areas under investigation in all the sections. To ensure the validity of the research instrument the researcher ensured that each specific objective, questions of study and objectives were addressed by items in the questionnaire. Expert judgment was used to enable the researcher identify weaknesses of the instruments and make appropriate adjustments. Two supervisors from Maasai Mara University were asked to give their advice on the questionnaire. After getting the advice views, the researcher edited the instruments accordingly.

The pilot study done to pre-test the instrument and cater for instrument validity. The instruments were administered to the respondents from six public secondary schools that did not participate in the main study giving a total of six respondents. The instruments were then being modified based on the results of the pilot test. Further, the findings from each of the three tools for collection were triangulated to strengthen the validity of the research findings and the efficacy of the tools in the data collection.

Reliability of the Instruments

Reliability refers to the consistency of results on replication of the same study using the same instrument (Bryman, 2012). It is generally understood to be the extent to which a measure is stable or consistent and produces similar result when administered repeatedly (Sushil & Verma, 2010). This study used split-half technique. Creswell (2013) asserts that split-half technique involves dividing research instruments into two, using a scientific sampling procedures. Systematic random method of splitting is advocated by Drost (2011) as the most realistic in ensuring splitting of research instruments do not lead to biased results. The researcher further underscores the need to ensure that before systematic splitting is performed, instruments must not have been arranged in a certain systematic manner.

In this study, the researcher split the instruments into half using systematic method, where two groups were created and two instruments were picked at a time and separated for each group. This continued until all of them were split. After this procedure, data was entered into SPSS and a correlation coefficient obtained for the two groups. A coefficient of 0.7 and above is considered reliable (Creswell, 2013).

Data Collection Procedures

The researcher was first to get a clearance letter to carry out research from the Board of Postgraduate Studies of Maasai Mara University. The researcher then sought permit to conduct research from NACOSTI. The researcher then contacted the County Director of Education for permission to do the research in the County.

The researcher made a visit to the sampled schools. The ethical clearance letter was presented that allows the study to be conducted from the ministry of education and a letter of introduction from the university as well. After the permission was granted to conduct the study, the researcher asked the principal permission to be allowed to give the questionnaire to Mathematics Teachers to fill it. The researcher then requested the principal to give results for the school for the last five years from 2012 to 2016.

The researcher recorded in the document analysis quality of grades C+ and above the grade, which the student ought to obtain in order to qualify for a course of study in the university. These grades were used to examine trends in Mathematics performance. Then the researcher administered to the principal interview guides where the principal was expected to answer questions about administrative strategies he or she had put in place to improve performance in Mathematics in the school. The researcher collected the research instruments after one day.

Data Analysis

The process where order, structure and meaning is given and brought to the information collected is known as data analysis (Mugenda & Mugenda, 2003). Chi-square was used to test the Hypotheses to evaluate the relationship between independent and dependent variables. The confidence level of hypotheses testing was 0.05. Once the data was collected, it was post-coded and analyzed using the Statistical Package for Social Sciences (SPSS) with help of computer software. Quantitative data gathered from closed ended questions was summarized and organized into similar themes as per the research questions. It was analyzed using frequency distribution table's percentages. Quantitative data presentation was through tables, percentages and normal distribution tables.

To integrate qualitative data obtained from open ended questions into inferential data. Data was organized and the interpretation of information was done. The qualitative data was reported through narratives and statement of the respondents. For the study to find out the interaction between the invitation of Mathematics specialists by the principals and how the students perform in Mathematics in KCSE examination, Chi-square was used.

To establish the effects of relationship between principals' support to teachers through Mathematics seminars/ workshop and how the students' perform in Mathematics in KCSE examination, Chi-square was used. To establish the effects of relationship between principals' organization of Mathematics contests and students' performance in Mathematics in KCSE examination, Enova was used. To establish the effects of principals' provision of teaching and learning materials on students' performance in Mathematics in K.C.S.E in Meru County, Chi-square was used.

RESULTS AND DISCUSSIONS

Response Rate per Secondary Schools per Category

The researcher targeted a representative sample of 92 secondary schools comprising of 64 mixed schools, 17 girls schools and 11 boy's schools were issued with the interview guides. Out of these, the entire 92 principal's filled and returned the interview guides making a response rate of 100.0%. The researcher also targeted 251 Mathematics teachers who were issued with questionnaires. However, only 223 successfully filled and returned the questionnaires making a response rate of 88.8%. These response rates were deemed high and enough to analyze and draw conclusions.

KCSE Performance in Meru County from 2012 to 2016

The dependent variable in the study was the student's KCSE performance in Mathematics. In order to obtain the trends in Mathematics performance, the researcher obtained a 5-year data from each of the 92 schools where the principals were interviewed. The results were as displayed in Table 4.1. However, the N value differed in each year as there were some schools that did not have students to sit for the national examinations in the respective years. These were mainly mixed day schools which had been opened recently and just started sitting for KCSE examinations.

Table 4.1: KCSE Performance in Mathematics in Meru County

	N	Mean	Std. Deviation
KCSE_2012	83	4.332	1.981
KCSE_2013	83	4.469	2.079
KCSE_2014	86	4.415	1.946
KCSE_2015	89	4.637	2.108
KCSE_2016	92	3.756	2.380
Average	83	4.322	2.099

From the findings, it was observed that the overall mean average performance of students in the selected schools was 4.322, with a high standard deviation value of 2.099. The total score was based on a 12-point, with 12 being the highest score and 1 being the lowest. Therefore, it was discerned that on average, the average performance of the selected school was D+. The high standard deviation demonstrated the disparity between the schools with high Mathematics performance and those with the lowest performance.

For instance in 2013, the mean score was 4.469 with a high standard deviation of 2.08. It could also be observed that the Mathematics performance in KCSE dropped in 2014 (mean =4.415) and again in 2016 (mean =3.756). This showed that the performance of schools in Mathematics is generally low, but due to the high standard deviation, it is evident that the school performance is not uniform. Rather, some school seem to be performing well while the majority are performing poorly as seen in the low mean score values of less than five.

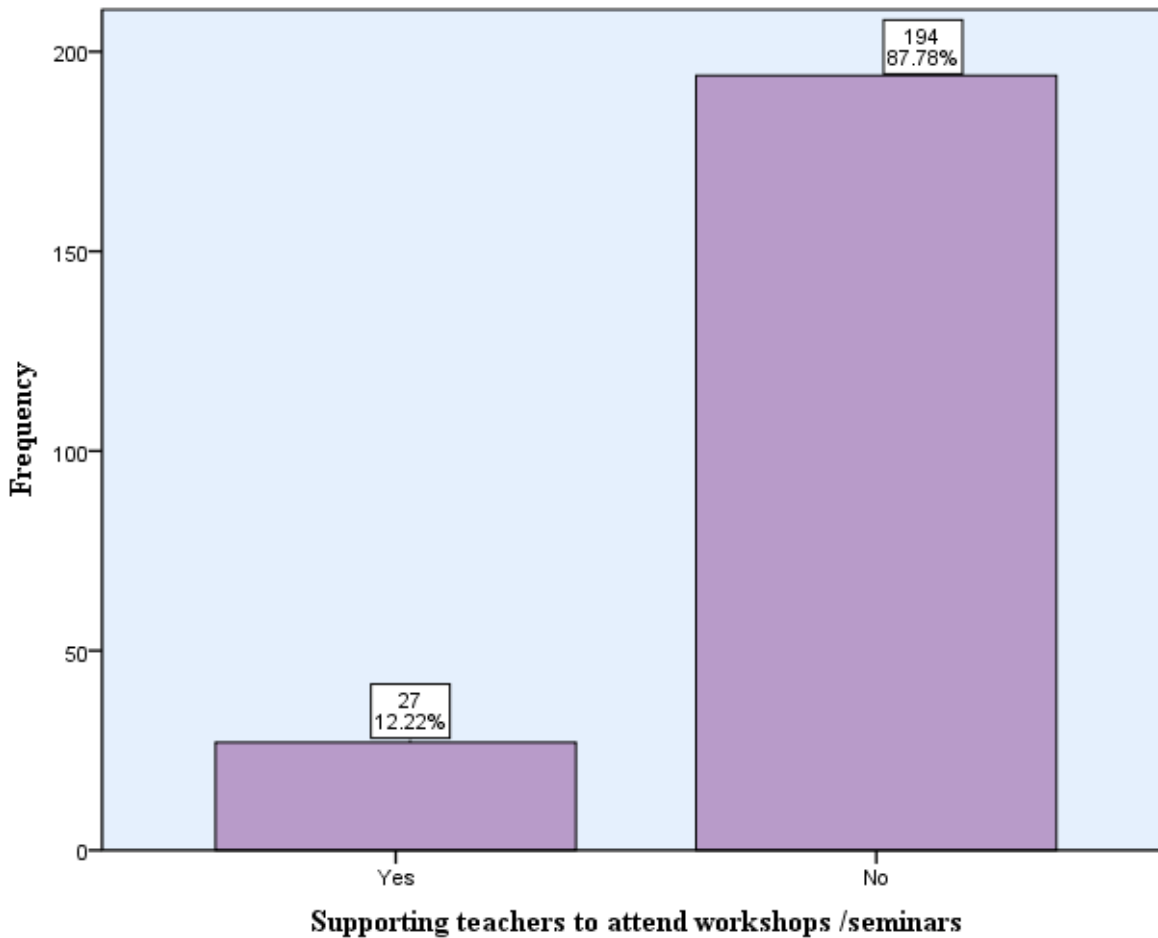
The table also shows that the performance has not been consistently improving, but rather, it increased between 2012 and 2014 before declining in 2014. In 2015 and 2016, a considerable decline in the performance can be seen. From these findings, it could be seen that there is no steady trend in the student's performance in Mathematics in KCSE. Rather, it was evident that the student's performance remain consistently poor in line with the national results which reveal a poor performance in Mathematics.

Principal's Support to Mathematics Teachers through Seminars and Workshops to Improve Performance in Mathematics

The second objective of the study sought to evaluate the effects of principals' support to Mathematics teachers through Mathematics seminars/workshop on student' performance in Mathematics in KCSE examination in Meru County. First, the researcher asked the Mathematics teachers to indicate whether their

principals supported them by sending them to seminars or workshops. Their responses are as displayed in the Figure 4.6.

Figure 4.6: Principals’ support for teachers to attend workshops/seminars

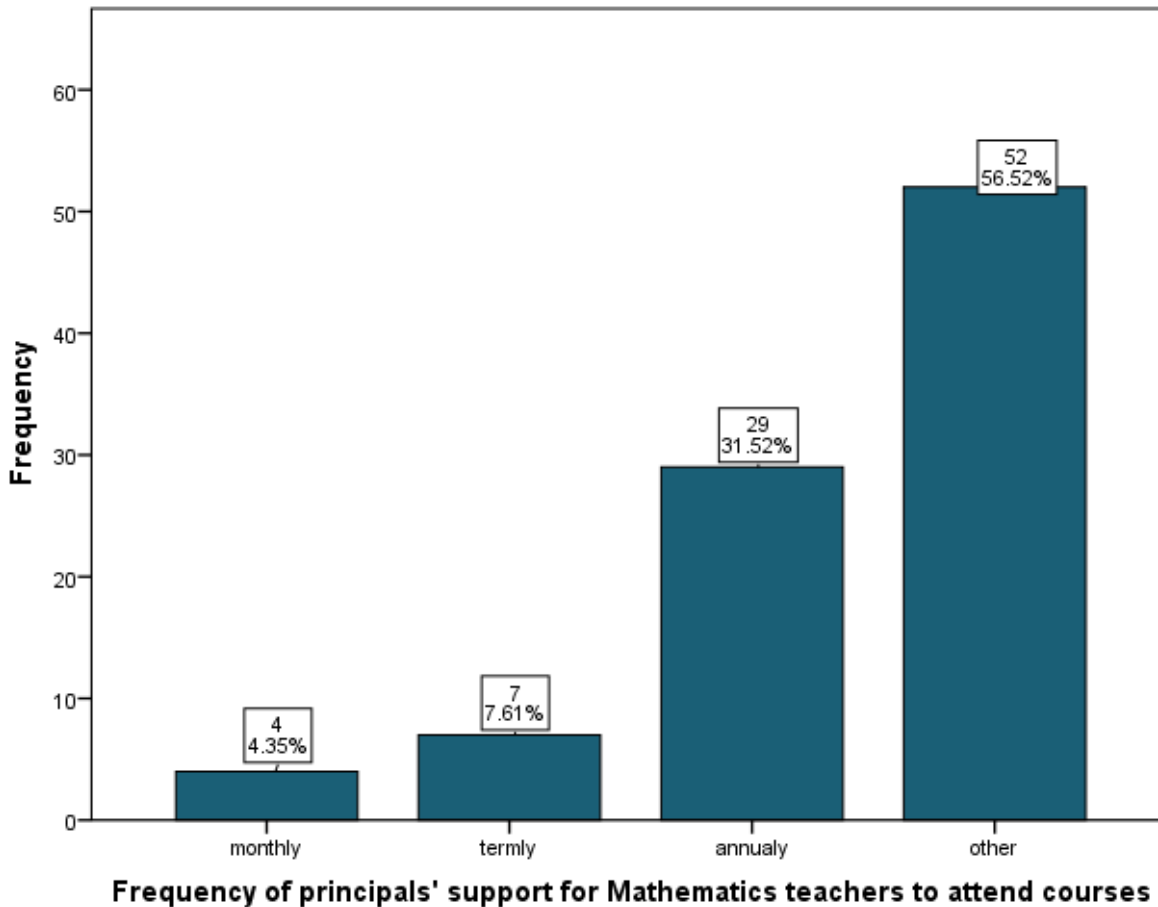


As indicated in the Figure 4.6, the majority of the Mathematics teachers 194 (87.78%) refuted the claim that their principals supported them to attend workshops or seminars with only a minority 27(12.22%) claimed their principals supported them to attend workshops.

From these findings, the researcher deduced that the majority of principals did not consider their Mathematics teacher’s attendance of workshops and seminars as being an important aspect of improving performance of students in Mathematics. This was irrespective of the skills and integration of new instruction skills Mathematics teachers stand to gain from the seminars and workshops.

The principals were then asked to indicate how many courses they had supported their Mathematics teachers to attend in the last two years. Their results are as provided in the Figure 4.7.

Figure 4.7: Course Support by the principals’ to their Mathematics teachers



It was seen that most of the principals 52 (56.52%) did not organize for their Mathematics teachers to attend professional development courses, while 29 (31.52%) supported their Mathematics teachers to attend courses annually, seven (7.61%) supported them once every term and 4 (4.35%) supported them once a month.

From these findings, the researcher deduced that in the majority of secondary schools in Meru County, little effort is placed on Mathematics teacher’s development through course attendance. These findings go hand-in-hand with the Mathematics teacher’s assertions in Figure 4.6 where the majority 194 (87.78%) asserted that their principals did not organize for them to attend workshops and seminars. The lack of continuous professional development through seminars, workshops and course attendance across the majority of schools could be linked to the continued dismal performance in Mathematics in Meru County. From the interview schedules, the majority of principals felt that the lack of resources was the major reason for their inability to organize courses to support their Mathematics teachers. One of the principals who did not support their Mathematics teachers to attend courses claimed:

“In my school, we lack resources and finances to send our Mathematics teachers out to seminars and workshops or even to professional development courses.”

Another principal claimed;

‘I do understand the importance of Mathematics teacher’s professional development through seminars and workshops, but strained finances really limited our ability to send our Mathematics

teachers to seminars and workshops frequently. We do try from time to time, but I feel that we are not really doing enough to ensure that our Mathematics teachers are well-equipped to promote better performance in Mathematics.'

These responses from the principals revealed that financial obstacles limited schools performance in KCSE in Mathematics. Therefore, the government should look for ways for giving schools adequate finances.

With reference to the lack of professional development, the researcher asked the principals how they motivated their Mathematics teachers to improve performances. One of the principals claimed:

'I provide the Mathematics teachers with materials for CATS such as printers and printing papers.'

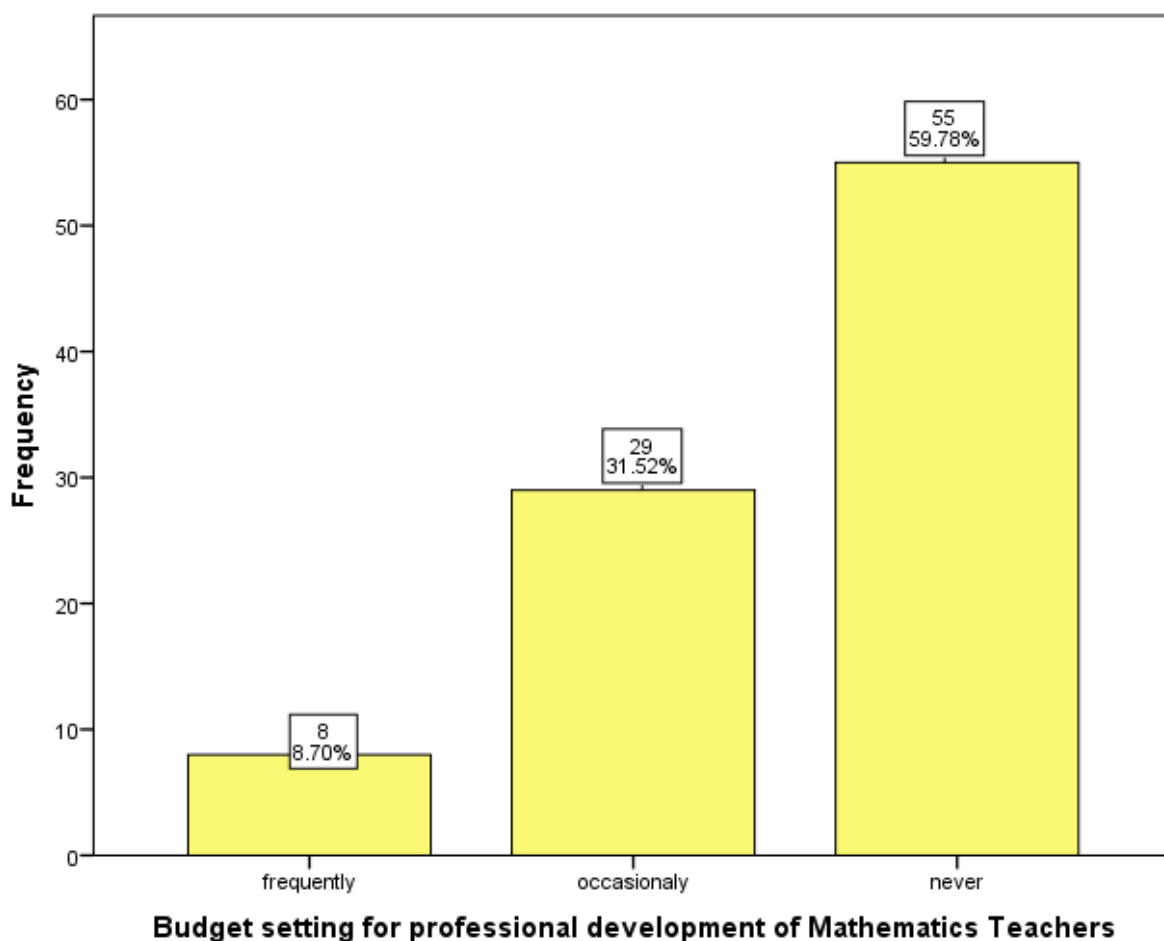
Another principal claimed,

'I allow my Mathematics teachers to attend workshops and seminars once a year, and then at the end of the years, I give outstanding Mathematics teachers a small 'bahasha' or small token to appreciate them. I also send them a congratulatory messages.'

These statements by principals were evidences that some principals supported their Mathematics teachers to improve performance in Mathematics. It was found out that they gave them material resources, supported them to go to seminars and gave them individual recognition, which resulted to improved performance in Mathematics.

The researcher then went forth to ask the principals to indicate how often their schools allocated a budget for teacher's professional development. The principals' responses are as indicated in the Figure 4.8.

Figure 4.8: Budget allocations for professional development for Mathematics teachers



It was seen that the majority of principals/schools 55 (59.78%) never allocated a budget for Mathematics teacher's professional development, while 29 (31.52%) occasionally set a budget aside and a minority eight (8.70%) set a budget for Mathematics teacher's professional development frequently.

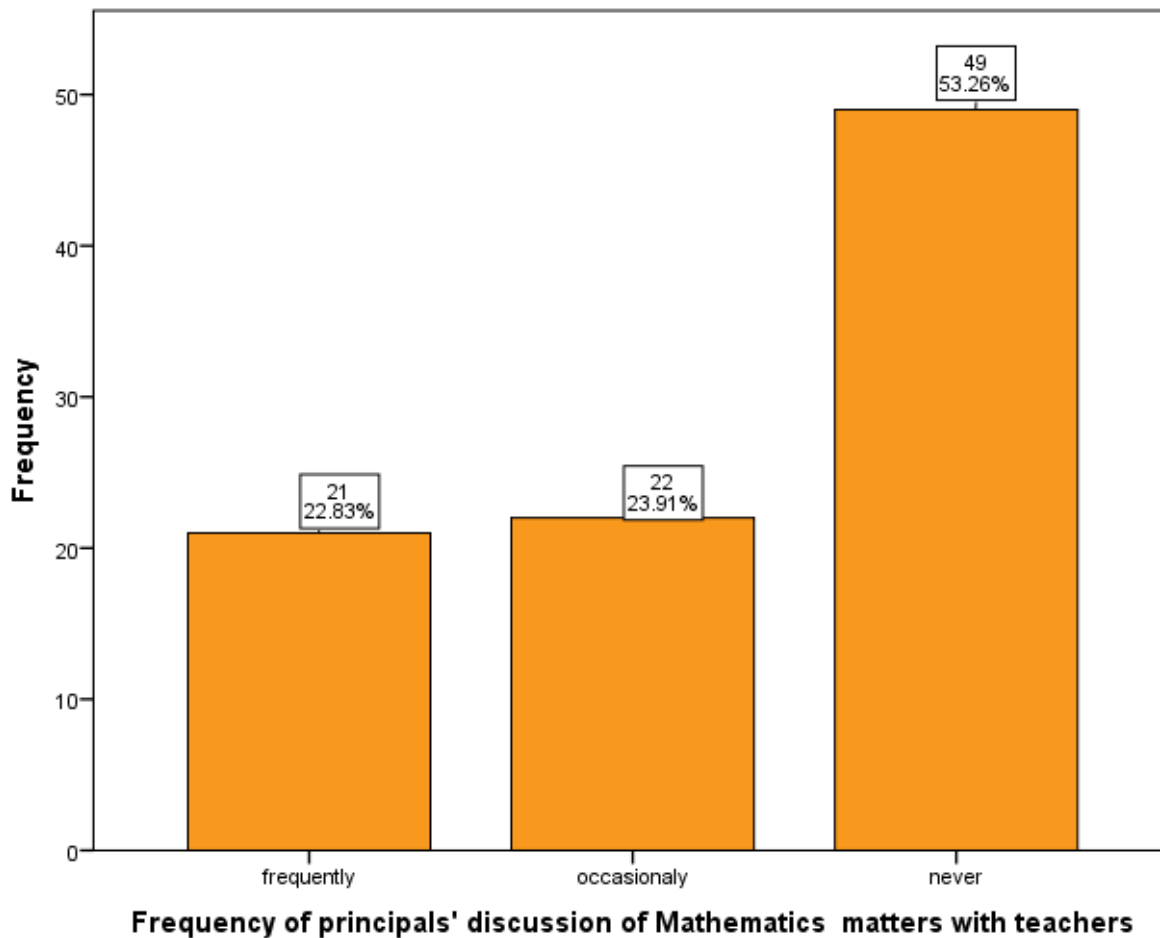
These findings showed that in majority of schools across Meru County, there was no budget set aside to ensure that Mathematics teachers engaged in professional development. This contributed to the declining students' performance in Mathematics as the teachers' knowledge and skills stagnated over the years as they lacked the engagement with peers and experts to initiate and share new ideas and instructional methods to improve students' performance.

These sentiments are expressed by the South Africa Department of Education (2008) which claims that professional development symbolized all the goings-on in teaching and learning with the aim of empowering the Mathematics teachers to accomplish their duties more competently and successfully towards achieving improved learner achievement.

It is concerned with enabling learners receive learning by providing Mathematics teachers with quality teaching skills and subject knowledge in order to enable them impart knowledge to the learners. Additionally, it was specified that teaching involves the experts to be well-informed of new developments, in order to be imaginative and passionate educators so that students could perform well.

The researcher also deemed it important to ask the principals how often they engage Mathematics teachers on discussions pertaining challenges and issues on teaching and learning Mathematics in their respective schools. The responses are as indicated in the Figure 4.9.

Figure 4.9: Discussion frequency to improve performance in Mathematics



The Figure 4.9 showed that most of the schools 49 (53.26%) never discussed matters that affected teaching and learning Mathematics with their Mathematics teachers, while 22 (23.91%) discussed them occasionally and 21 (22.83%) discussed them frequently.

From these findings, the researcher discerned that the majority of schools did not engage their Mathematics teachers to find out what challenges or issues they experience while teaching and learning Mathematics. Therefore, even when teachers were facing challenges, they lacked a platform with which to air their grievances or ask for support; this compromised the delivery of services and how students performed in Mathematics.

The researcher then sought to determine whether the allocation of a budget and discussion of issues and challenges had an association with the student’s performance in KCSE. To achieve this, a chi-square test of independence was conducted at 95% confidence interval. The findings are as displayed in Table 4.6.

Table 4.6: Chi-Square- Principal's support and KCSE performance in Mathematics

Principal's support	KCSE PERFROMANCE					P=value
		N=92	Poor	Average	Good	
Budget allocation	Frequently	F	1	3	4	0.000
		%	1.09	3.26	4.35	
	Occasionally	F	12	16	1	
		%	13.04	17.39	1.09	
	Never	F	54	0	0	
		%	58.7	0	0	
Mathematics discussions	Frequently	F	8	9	5	0.000
		%	8.7	9.78	5.43	
	Occasionally	F	8	14	0	
		%	8.7	15.22	0	
	Never	F	48	0	0	
		%	52.17	0	0	

As the Table 4.6 shows, most of the schools that frequently allocated budgets for Mathematics teacher's professional development four (4.35%) had good performance while only one (1.09%) of poor performing schools allocated budgets frequently.

Similarly, the table shows that among the schools that occasionally set aside budgets for Mathematics teacher's professional development, the majority 16 (17.39%) were from average performing schools while all 54 (58.7%) of the schools that did not allocate budgets for Mathematics teacher's professional development performed poorly.

From these findings, it was seen that there is an association between budget allocation for Mathematics teacher's professional development and the school's performance in Mathematics. These findings are echoed by the chi-square results which showed that there is a statistically significant association between budget allocation for professional development and the school performance at p value ($p=0.000 < 0.05$).

These findings showed that schools that invested in their Mathematics teacher's professional development increased their students' performance while those that neglected to develop their Mathematics teachers professionally continued to perform dismally.

The above findings were supported by the claims by the Department of Education (2008) which stresses that schools need to have staff professional developmental programs in order to achieve endurance in professional development. Professional development should be understood by the principal who is the instructional leader as a tool designed to clarify learners' achievement. Developing the staff is therefore as a way to achieve better, have active and efficient school teaching and learning.

To have effective professional development, therefore, there should be a focus to improve instructional practices, where Mathematics teachers are provided with new knowledge and have methods to evaluate learning with the aim of improving students' learning (Wei, Darling-Hammond, Andree, Richardson and

Orphanos, 2009).

Additionally, Essien, Akpan and Obot (2016) also reported that there was a positive correlation between the principal's support of teacher's attendance of seminars, workshops and in-service training. According to the findings, it is evident that the developing teachers professionally was crucial for the performance of learners.

This may be due to the performance of learners being largely dependent on the quality of the teacher; therefore, when principals send teachers to in-service training, seminars and workshops, they are improving the quality of the teachers and the benefits are derived by the students when the teachers could effectively utilize the resources and the classroom environment to deliver content.

In this case, it was deduced that when the teacher's needs are met through their professional development, their competence increases. However, if the teacher's professional needs are not met, then the teacher will be dissatisfied making the teacher unstable and would not be productive. Therefore, in this case, the majority of the schools have been found to fail in allocating budgets to facilitate teacher's professional development.

Therefore, drawing from the assertions of Wei, Darling-Hammond, Andree, Richardson and Orphanos, (2009); Essien, Akpan and Obot (2016) it was evident that the poor performance of the school that did not set aside budgets to send teachers to workshops and seminars stems from the minimal expertise that teachers could get from attending professional development classes.

Additionally, as Essien, Akpan and Obot (2016) affirms, teachers whose professional needs are not met are often psychological unstable and therefore, unproductive. These teachers feel unappreciated and as such, may be dissatisfied and inadequately motivated resulting in poor delivery of subject content. Further, Kyalo, Chepketer, and Kyalo (2016) also reported that despite some schools having well qualified and well-trained teachers there are many instances where teachers require refresher courses to help improve their teaching performances.

As such, it was seen that the performance of students is still poor, more so in public schools. It is evident that the schools are not offering teachers the chance to refresh their skills and knowledge just as has been identified in the current study.

The Table 4.6 then shows that the schools that had good performance five (5.43%) held frequent discussions with their Mathematics teachers to discuss issues and challenges in teaching and learning Mathematics. Similarly, the majority of the schools that occasionally held discussions 14 (15.22%) recorded average performances while the majority of the poorly performing schools 48 (52.17%) never held discussions with Mathematics teachers to discuss issues affecting teaching and learning of Mathematics in their respective schools.

From these findings, it was evident that holding discussions with Mathematics teachers to highlight and discuss the issues facing Mathematics teachers and students in teaching and learning Mathematics had a significant effects on their performance evidenced by the p value of $0.000 < 0.05$, which was not statistically significant.

From these findings, it was seen that holding frequent discussions gives the Mathematics teachers an opportunity to air the challenges facing them, highlight the issues and find a way to overcome them. Additionally, it affords them the chance to share ideas with peers on effective teaching and instruction

strategies. They could also set goals and plans on how to achieve them. Contrary, the schools that did not engage in occasional or frequent discussions with their Mathematics teachers limit the opportunities for Mathematics teachers to air their grievances, challenges and ideas with the administration and their peers. As a result, the Mathematics teachers were left to deal with issues facing the teaching and learning of Mathematics, which compromises the performances in the subject. This was more so if the issue was beyond the Mathematics teacher's ability to resolve personally.

These findings were supported by the claims made by Gumus and Akcaoglu (2013), who reaffirmed that principals had essential instructional tasks which include leading in support of professional development programs and discussions. These tasks, pointed to the fact that one of the principal's role is to support the Mathematics teachers' growth whether directly or not. It could also be said that two significant behaviors of effective principals who absolutely affected learners' education talk with Mathematics teachers, model, give feed-back and provide opportunities for professional development.

The principals are supposed to have knowledge about instruction for them to give advice, assess, monitor and direct Mathematics teachers. The principal as the instructional leader was supposed to make sure that Mathematics teachers formulated challenging programs through their attendance of developmental workshops.

Besides, as an instructional leader, the principal must give other Mathematics teachers the chance to be involved in planning for staff development programmes because the end results was a feeling of ownership of the programmes. Additionally, Kyalo, Chepketer, and Kyalo (2016) claimed that the teacher capacity development had a significant effect on how the students performed.

In this case, it was evident that allowing teachers to come together with the administration is a major means of building their capacity. It provides a platform for teachers to interact with their colleagues, share insights, challenges and suggestions on how to address them.

However, it is evident from the chi-square findings that the majority of schools did not hold discussions with the teachers, which in turn has a significant effect on the students' performance. This shows that as long as schools overlooked the importance of holding discussions with the teachers to discuss pertinent issues, then students' performance would continue to be dismal seeing that the schools that hold frequent discussions performed well.

Conclusion

The researcher concluded that attendance of workshops and seminars were minimal and non-existent in majority of the schools and considering that there is a significant association between teacher's attendance of workshops and seminars and student performance in Mathematics. It was concluded that the poor attendance of seminars and workshop for professional development has negatively affected the school's performance in Mathematics.

Recommendations

- i. The principals need to send their Mathematics teachers to more seminars and workshops to promote their professional development.

- ii. The county government and other stakeholders should band together to provide resources and finances to support Mathematics teacher's attendance of seminars and workshops.

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