



## Teacher Preparedness and Learners Performance in Mathematics at Kenya Certificate of Primary Education in Baringo Central Sub-County, Kenya

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### Abstract

*In school curricula, mathematics plays a crucial role and of great importance in our daily life; yet there is low mathematic performance of pupils in the world over and Kenya is no exception. Mathematics performance in Baringo County is not satisfactory. The purpose of this study was to determine the influence of teacher preparedness on performance of mathematics in Kenya Certificate of Primary Education in Baringo Central Sub-County, Kenya. The study used social constructivism theory developed by Vygotsky. The study used descriptive survey design and the data collection was done through the questionnaires and interview schedule. The target population consisted of 139 head teachers, 973 mathematics teachers. The study adopted purposive sampling to obtain the mathematics teachers. In the study a sample of 125 head teachers and 467 mathematics teachers was obtained. Data was analyzed using both qualitative (means, standard deviation) and inferential statistics (Pearson's Product Moment Correlation). Qualitative data was analyzed using thematic analysis. The findings established that there was a strong positive and significant influence of Teachers' preparedness on performance of mathematics ( $r = 0.214$ ,  $\text{sign.} = 0.019$ ) in Kenya Certificate of Primary Education in Baringo Central Sub-County, Kenya. The study findings clearly revealed that teacher preparedness had influences on the performance of mathematics at KCPE in Public Primary schools in Baringo Central Sub- County, Kenya. The findings conclude that teachers' preparedness largely depended on the professional documents of the teachers like scheme of work, lesson plans, records of work, lesson notes and registers to enable the pupils perform at KCPE. The study recommends that teacher preparedness should be considered in ensuring that teachers perform to their expectations. The professional trainings offered by different organizations to the teachers should be frequently offered to the teachers so that they can improve on their exposure of teaching mathematics.*

**Key words:** Influence, Teacher Preparedness and Learners' Performance

### INTRODUCTION

Globally, mathematics as subject is very important to present environment because it offers the crucial foundation of content. American Institute for Research (2007), conducted studies to investigate performance in mathematics of United States of America student's 4<sup>th</sup> and 8<sup>th</sup> grades as compared with peers around the world that examined performance of students in mathematics of scores 4-12, found that pupils in grade Four performed poorly from 1996-2007. The study also found out that teachers contributed majorly to the dismal performance in mathematics in the US (AIR, 2007). This characteristic of under achievement in mathematics is also observed in the middle

income and developing countries. According to Armstrong & Henson (2009) proper lesson planning with appropriate instructional aids promotes quality instructions experience to the pupils. For effective teaching and learning process promotes teachers' preparedness (Indimuli et al., 2009).

In African countries, international mathematics and science study in 2003 revealed the average performance was poor in quality education, as compared to other countries in the world. Most recent mathematics education researches are motivated by learners' performance in mathematics. Most concerns have been on the teacher's effectiveness has been put under investigation; reforms in standards of teaching and learning of the teacher professional development platforms have been reconsidered such as in-service training (National Council of Teachers of Mathematics, 2000, Zaslavsky, Chapman & Leikin, 2003). In developed countries such as South Africa, research reveals that teachers are of great importance as far as performance in mathematics is concern. Such studies show that factors affecting performance of mathematics such as teachers training, teaching methods, professional development, teacher motivation and teacher preparedness have not been exhaustively dealt with (Opolot-Okurut, 2005; AIR, 2007; Ololube, 2006; Zaslavsky, Chapman & Leikin, 2003). In Uganda, dismal performance in mathematics has been in public limelight especially in national examinations. Eighty three percent of the factors hindering opportunities of primary school pupils to learning of mathematics are teacher-centered. This is according to studies conducted in Makerere University. The factors include poor methods of teaching (Opolot-Okurut, 2005).

In 2003 Kenya introduced Free Primary Education (FPE) program with increased enrollment of over one million learners in public schools (Government of Kenya, 2005). According to Ngware, Oketch, & Ezech, (2011), due to increased enrollment of learners most classes had class size of over 80 learners in government aided primary schools. The instructor's targets of producing high results on national examinations remain high despite high teacher-learner ratio. Looking into the standard of teaching makes one understand what is happening during the classroom instructions in primary schools. Interactions of instructors in class room that assist learners to study are mostly complex process that relies on awareness of pedagogical and interpersonal aspects. According to Morrison, Bachman, & Connor, (2005), determination of how much is learned in the classroom by pupils is due to instructors' pedagogical and interaction skills. However, under achievement in mathematics, remains a global concern even in the developed states. In Kenya, one of the compulsory subjects is mathematics examinable for all candidates at Kenya Certificate of primary Education level. According to Government of Kenya (2008) posits that achievement of vision 2030 is important and cannot be ignored. Performance of mathematics in many regions however varies, posting good performance while others perform poorly. In connection to this, instructor-based education interventions have been implemented in collaboration with donor agencies by the Kenyan government. The basic aim is to upgrade on the achievement in the subject of mathematics in primary schools. The instructor-based education interventions include SPRED, SBTD and recently SMASE program (Republic of Kenya, 2008, CEMASTE, 2012). These instructor-related factors affecting the performance of mathematics in Kenya show little empirical evidence. According to University of Nairobi (2008), professions like pharmacy, medicine and other business-related professions like banking and finance, accounting require mathematics as a key subject. In order for one to qualify to pursue the mentioned careers mathematic score must be very high. In Kenyan 8-4-4 system of education mathematics is one of the compulsory and core subjects for learners. The nature and the proportion of time (seven lessons a week in primary school upper

classes) allocated to mathematics emphasize the major importance given to mathematics.

Ideally, one of the examinable and compulsory subjects in KCPE and KCSE is mathematics. Its important role towards achievement of vision 2030 in Kenya should not be ignored (Government of Kenya, 2007). The government of Kenya in conjunction with agencies of donor origin has considerably implemented the instructor-based educational involvement to improve on the pupil's academic achievement in science subjects specifically mathematics in all the primary schools in Kenya. According to Republic of Kenyan (2008); CEMASTE (2012) introduced the following interventions like SBT, SPED and recently SMASE program.

Despite the instructors-based interventions being implemented, learners' performance in mathematics in Baringo Central Sub-County has remained below educational stakeholders' expectations. Performance of mathematics in national examinations is a key subject during selection of students for core courses in university and tertiary. Performance of mathematics all over the sub-county however vary with certain areas posting high grades while other posting low grades. Despite all the instructors- based interventions in public primary school there is persistent low academic performance in mathematics.

However, the results for the six zones in Baringo Central Sub-County for the last five years shows that Salawa zone is the leading with maximum means score of 44.218 while Tenges zone is the most affected zone with the minimal means score of 28.732. All the six zones in the Sub-County have registered low performances and this calls for immediate action hence the need to establish whether the dismal performance is linked to teacher preparedness. It is on this back drop that the study investigated whether there is influence of teacher preparedness on performance of mathematics at KCPE in Baringo Central Sub-County, Kenya.

### **Research Objectives**

To determine the influence of teacher preparedness on performance of mathematics at KCPE in Baringo Central Sub-County, Kenya.

### **Null Hypothesis**

There is no significant influence of teacher preparedness on performance of mathematics at KCPE in Baringo Central Sub-County, Kenya.

## **LITERATURE REVIEW**

### **Influence of teacher preparedness on mathematics performance**

Armstrong, Henson & Savage (2009), indicate that there is need to plan lessons well and prepare adequately. Characteristics of a 21<sup>st</sup> century teacher are to be able to match instructions and programs to learners' characteristics and conducting tasks appropriately. Lessons ought to be simulative to learners in order to be taught with new ideas. Armstrong et al, (2009) furthermore explains that while you are properly planning and engaging with learners is based on "task- analysis activities." This requires that you take content to be taught and identify the desired outcome. Secondly divide the content into smaller units and state the desired final teaching approaches you will use and specify objectives. Every teacher needs to prepare teaching process in advance and any other teacher professional document required at a given time. Those documents are used to effectively implement curriculum hence high performance in exams (Thungu, Wandera, Gachie & Alumande, 2008).

According to Indimuli et al (2009), teacher preparation is very important in effective learning. Effective learning includes preparing, implementing and evaluating work done. The appropriate use of instructional materials is very important just like using effective methods of teaching when taking a mathematics lesson. Achievement of results and use of learning and instructional material should be unlimited to teachers since they need to demonstrate to students what they are teaching (Ernest, 2000). For instructions to be effective, they need quality instructional materials and instructors' knowledge (Gauthier & Lawson, 2004). Quality instructional materials motivate learners to learn encourage them to study by providing them with conducive opportunity to have access to relevant information.

Manipulative material usage produces greater achievement than without using them in mathematic activity-based learning in lower grades of learning up to grade eight in schools (Douglas & Kristin, 2000). Learners' achievement and attitude improved due to sage of long-term concrete resources to be used by the instructors. According to Douglas & Kristin, (2000) who posits that the choice of concrete resources improves on certain issues of skills in student. Several scholars however, established aspects that attributed to learners' poor performance (Benson, 2011; Miheso, 2002). The instructors' failing to apply the learner-centered approach, lack of professional exposure, lack of practical modeling, lack of experiments for the learners leading to poor performance in mathematics (Eshiwani, 2001). Teaching or instructional methods greatly influence learners' mathematics performance.

## **METHODOLOGY**

The study employed both Qualitative and Quantitative approach. Descriptive survey design was adopted because the nature of data obtained was descriptive (Mugenda & Mugenda, 2011). Qualitative and Quantitative approach was used specifically using interviews schedules and questionnaires for collecting data. The target population was made of 139 head teachers and 973 instructors of mathematics. The processing of selection of groups with same characteristics was established in the entire group (Kombo & Tromp 2006). Mugenda & Mugenda (2011) suggested that for descriptive studies 10% or above of the population is enough for the study. The study adopted purposive sampling technique where all the 125 head teachers or their deputy head teachers in case the head teacher were absent. The 54 classroom teachers teaching classes seven and eight learners were obtained from the sampled institutions. Purposive sampling was used on two instructors of mathematics. To calculate the sample size from the target population, a table by Krejcie & Morgan (1970) for determining sample size was adopted. According to Krejcie & Morgan, (1970), a sample of 125 head teachers, 467 teachers were used for this study. Purposive sampling was applied because mathematics teachers possess reasonable understanding of the information needed in this study. Data collection considered the preparation of the instruments such as questionnaire and interview schedule (Mugenda & Mugenda, 2011). Descriptive and inferential statistics for the analysis of data was adopted. It involved the use of frequencies, mean, standard deviation and Pearson Linear Correlation Coefficient using Statistical Package for Social Sciences (SPSS) version 27. The qualitative data was analyzed through thematic analysis.

## RESULTS AND DISCUSSION

**Table 1: Teachers' Preparedness on Performance of Mathematics at KCPE**

| Professional Documents | N   | Always |    | Rarely |    | Never |   |
|------------------------|-----|--------|----|--------|----|-------|---|
|                        |     | F      | %  | F      | %  | F     | % |
| Schemes of Work        | 328 | 310    | 95 | 10     | 3  | 8     | 2 |
| Lesson Plans           | 328 | 301    | 92 | 16     | 5  | 3     | 1 |
| Records of Work        | 328 | 286    | 87 | 34     | 10 | 8     | 2 |
| Lesson Notes           | 328 | 267    | 81 | 52     | 16 | 9     | 3 |
| Register               | 328 | 278    | 85 | 40     | 12 | 10    | 3 |

*Source: Researcher (2021)*

The findings in Table 1 clearly reveal that over 95% of the respondents agreed that schemes of work, lesson plans, records of work, lesson notes and registers always influenced on teachers' preparedness on performance of Mathematics at KCPE, while a few responded that rarely does schemes of work, lesson plans, records of work, lesson notes and registers influence on teachers' preparedness on performance of KCPE and lastly very few responded that schemes of work, lesson plans, records of work, lesson notes and registers does not influence on teachers' preparedness of mathematics at KCPE. The findings clearly reveal that teachers' preparedness largely depended on the professional documents of the teachers like schemes of works, lesson plans, records of work, lesson notes and registers to enable the pupils to perform at KCPE.

The findings concur with the study by Ball et al., (2005) who posits that specific instruction information of mathematic is closely linked to preparedness of individual teacher and the level he/she prepares the learners to tackle mathematical problems. Instructors who passed highly during their school times, correlated with the performance of their learners in school on mathematic performance. The findings lend credence from Ball et al., (2005) who states that the teacher preparedness and mathematics' knowledge is the pillar in offering their service as mathematics teachers and their ability to monitor their learners' subject progress. The findings concur with National Council for the Teaching of Mathematics, (2000) which observed that teachers need proper foundation, correct attitude and knowledge in mathematics which is central to their output.

**Table 2: How do you assess pupils in your school?**

| Response        | Frequency | Percentage (%) |
|-----------------|-----------|----------------|
| Tests           | 76        | 23             |
| Class Exercises | 11        | 3              |
| Quizzes         | 6         | 2              |
| Terminal Exams  | 235       | 72             |
| Total           | 328       | 100            |

*Source: Field Data (2021)*

The findings in Table 3 reveal that 235 (72%) of the respondents agreed assessing the pupils using the terminal exams to confirm their capability in terms of performance in Mathematics, 76(23%) of them agreed that tests were the option of confirming pupils performance in Mathematics, 11(3%) of the respondents agreed that class exercises confirmed the pupils preparedness and lastly 6(2%) of them agreed that quizzes were the option to learn the preparedness of the pupils in school. The findings reveal that

majority of the respondents agreed that terminal exams were the better way of assessing pupils in mathematic preparedness. Of course, all the other options had respondents suggest as options of assessing learners but were basically not convincing enough to warrant them to be assessed in KCPE performance in primary schools. The findings corroborate with those of Thungu, et al., (2008) who assert, that every teacher needs to prepare teaching process in advance and any other teacher professional document required at a given time. Those documents are used to effectively implement curriculum hence high performance in exams.

During interviews with the respondents regarding the influence of teachers' preparedness on performance of mathematics at KCPE in Baringo Central sub-county, Kenya they responded in support of teachers need to fully prepare before they can deliver their mathematic lessons, mathematics being a subject many pupils fear yet if the teachers prepare well the lesson will be accommodative to the learners.

Head teacher, HM1, further observed,

*"In order for learners to comprehend the content of the subject specifically mathematics, the concerned teachers need to properly preparation for the class. This involves clear lesson plan objectives generated from the schemes of work, clear teaching materials and resources, availability of reading material for the learners to consult after the lesson. The preparation will enable the learners to even develop passion for the subject".*

Just like in quantitative findings, these views point to the fact that proper preparation of lessons with clear objectives, schemes of work, lesson plan, instructional materials and teaching and learning material will contribute to high performance of learners in school. These views are in agreement with scholars such as Gauthier & Lawson, (2004) who argue that for instructions to be effective, they need quality instructional materials and instructor's knowledge. Quality instructional materials motivate learners to learn encourages them to study by providing them with conducive opportunity to have access to relevant information.

Inferential Findings on the Influence of Teachers' preparedness on performance of mathematics at KCPE in Baringo Central Sub-County, Kenya.

The study tested null hypothesis one using the Pearson Product Moment that there is no significant influence of teachers' preparedness on performance of mathematics at KCPE in Baringo Central Sub-County, Kenya as shown in Table 3:

**Table 3: Indicates the Pearson' linear correlation coefficient on influence of Teachers' preparedness on performance of mathematics at KCPE in Baringo Central Sub-County, Kenya**

|                               |                 | Teachers'<br>Preparedness | Performance of<br>Mathematics |
|-------------------------------|-----------------|---------------------------|-------------------------------|
| Teachers'<br>Preparedness     | Pearson         | 1                         | .214*                         |
|                               | Correlation     |                           |                               |
|                               | Sig. (2-tailed) |                           | .019                          |
| Performance of<br>Mathematics | N               | 328                       | 328                           |
|                               | Pearson         | .214*                     | 1                             |
|                               | Correlation     |                           |                               |
|                               | Sig. (2-tailed) | .019                      |                               |
|                               | N               | 328                       | 328                           |

\* Correlation is significant at the 0.05 level (2- tailed)

Data Source: Researcher, (2021)

The findings in Table 3 reveal that there was strong positive and significant influence of Teachers' preparedness on performance of mathematics ( $r = 0.214$ ,  $\text{sign.} = 0.019$ ). A Pearson Product-Moment Correlation determined the influence of teachers' preparedness on performance of mathematics at KCPE in Baringo Central Sub-County, Kenya. The findings established a correlation coefficient of  $r = 0.214$  and significant level (p-value) of 0.019 which is less than the predetermined level of significance, 0.05, that is,  $p\text{-value} = 0.019 < 0.05$ . The results proved to be statistically significant showing that there was a significant influence of teachers' preparedness on performance of mathematics at KCPE in Baringo Central Sub-County, Kenya. The conclusion therefore, to reject the null hypothesis, that there was no significant influence of teachers' preparedness on performance of mathematics at KCPE in Baringo Central Sub-County, Kenya. The findings agree with those of Thungu, et al., (2008) who posit that every teacher needs to prepare teaching process in advance and any other teacher professional document required at a given time. Those documents are used to effectively implement curriculum hence high performance in exams. The findings concur with those of Douglas & Kristin (2000), who assert that manipulative material usage produces greater achievement than without using them in mathematic activity based learning in lower grades of learning up to grade eight in schools.

### CONCLUSION AND RECOMMENDATIONS

The study concludes that teacher preparedness influences on the performance of the learners. This therefore clearly emphasis that at all times the teacher should be provided and supervised to confirm if the necessary requirements for teaching are available. The director of studies or the person charged with the responsibility to monitor the teachers should always have the reports about their progress. The findings conclude that teachers' preparedness largely depended on the professional documents of the teachers like schemes of work, lesson plans, records of work, lesson notes and registers to enable the pupils perform at KCPE. The findings further conclude that teacher preparedness results on the performance of the learners in class. It also builds on the confidence the teacher deserves to have during the facilitation of the lesson. The findings concluded that teacher preparedness and mathematics knowledge is the pillar in offering their service as mathematics teachers and their ability to monitor their learners' subject progress. Teacher needs proper foundation, correct attitude and knowledge in mathematics which is central to their output.

The study recommends that teacher preparedness should be considered in ensuring that teachers perform to their expectations. The head teachers should always provide the necessary instructional materials and monitor the teachers' progress through the office of director of studies. The study also recommends that Ministry of Education through the Teachers Service Commission to always provide teachers with professional documents; training and adequate supervision in terms of schemes of work, lesson plans, records of work; lesson notes and registers to enable the pupils perform at KCPE.

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