

Full Length Research Paper

Effects of teacher mentoring on the classroom practices of lower grade primary school teachers in Kwale County, Kenya

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Teacher classroom practices have been identified as the key contributing factor to the low learning outcomes of primary school grades in Kenya. Teacher mentoring has the potential to improve classroom practices and this study sought to determine its effects on the classroom practices of primary school teachers in Kwale County, Kenya. Using One Group Repeated Measures Quasi-Experimental Design, one cohort of 40 teachers in 22 public primary schools was mentored for 20 months, from May 2016 to October 2018. A classroom observation tool was used in data collection during this period. The tool achieved a Cronbach's Alpha reliability coefficient of 0.84, 0.81 and 0.79 in 2016, 2017 and 2018 respectively. Data was analysed using Repeated Measures ANOVA and teacher mentoring had a statistically significant effect on mean classroom practice score at $F=6.282$, $df=2$, $p=0.003$. Significant mean differences were located between 2016 and 2017 in favour of 2017, and between 2016 and 2018 in favour of 2018. There was no significant mean difference between 2017 and 2018. In conclusion, teacher mentoring is effective in improving teacher classroom practices and should be integrated into the formal school programme in Kenya.

Key words: Teacher mentoring, classroom practices, teacher quality, learning outcomes.

INTRODUCTION

Quality of education in Kenya

In January 2003, the Government of Kenya introduced Free Primary Education (FPE) opening opportunities for more children to enter into primary schools. A report by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) noted that this strategy raised enrolment from 6.1 million in 2002 to 7.2 million in 2003,

increased Net Enrolment Rate (NER) from 77.3 to 80.4%, and Gross Enrolment Rate (GER) from 88.2 to 102.8% (UNESCO, 2004). However, the introduction of FPE in Kenya led to increased teaching load for teachers, large class sizes, and poor performance of learners at primary school grades (Gakure et al., 2013; Oketch and Mutisya, 2013). For instance, less than 40% of grade three children attained the desirable competency level for a

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grade two English reading task in a national reading assessment in 2015 (Twaweza, 2016). The problem is more pronounced in rural and remote areas of Kenya. For instance, only 17% of grade three children attained the desirable competency level for a grade two English reading task in Kwale County (Twaweza, 2016; Glennerster et al., 2011). Furthermore, the overall mean score in the Kenya Certificate of Primary Education (KCPE) examination at grade eight in Kenya remained below the average of 250, out of a possible 500 scores from 2003 to 2014 (Oketch and Mutisya, 2013; Karongo and Orodho, 2014). This situation requires an intervention to break the cycle of low learning outcomes.

The learning outcomes at the early primary grades are critical for continued retention and success in upper primary grades. For instance, children who master reading skills in the lower grades are more likely to remain in school, attain better academic performance in future, and have more social and economic prospects (Patrinós and Velez, 2009; Musen, 2010). The key factors contributing to low learning outcomes are low teaching subject mastery and pedagogical content knowledge among teachers, which are attributed to inadequate pre-service and in-service teacher training, and insufficient teacher pedagogical support (Wanjiru, 2017; UNICEF, 2016; Oketch and Mutisya, 2013).

Teacher quality

Teacher quality is a key determinant of student learning outcomes, and teachers will play a key role in closing the gap between poor and good quality education, by maximizing the benefits of learning in every classroom for every child (UNESCO, 2014; Bold et al., 2017). Furthermore, children are more likely to attend and remain in school when the quality of teaching in high (UNESCO-UIS, 2006). Therefore, to achieve quality education, more efforts should increasingly focus on teacher quality, as many teachers are unqualified or underprepared to meet the educational demands of the 21st Century (UNESCO, 2014). Some of the questions that frequently comes up are whether teachers have adequate subject content knowledge, understand how students learn, have ability to plan for teaching, can perform adequately in classrooms, and learn from the teaching experience Bold et al., 2017).

Sub-Saharan African countries have the highest proportion of teachers that lack adequate mastery of both teaching subject content and pedagogical content knowledge (UNESCO-UIS, 2006). For instance, only 34% of lower grade teachers in Kenya demonstrated minimum subject content knowledge of the language subject they are teaching (Bold et al., 2017). Bold (2017) further notes that the teachers had poor pedagogical content knowledge and the ability to assess students' learning, which was attributed to low standards for entry into

pre-service teacher training and low-quality of teacher training programmes. The implication is that teachers are poorly prepared to deliver lessons and use inappropriate teaching methodologies which translate into low learning outcomes (Wanjiru, 2017).

Teaching practice during pre-service teacher training produces more effective teachers and higher learning outcomes (Hightower et al., 2011; Co et al., 2016; OECD, 2009). It is therefore important that pre-service teacher training programs should incorporate adequate time for teachers to practice in a real classroom situation. However, little time is allocated for classroom practice during pre-service teacher training in Kenya, with only six weeks of teaching practice assigned for teachers of primary schools (Bold et al., 2017; Wasonga et al., 2015). Furthermore, teachers in the rural and remote areas of Kenya have few opportunities for professional development, which is attributed to resource constraints (Wanjiru, 2017; UNICEF, 2016; Oketch and Mutisya, 2013). The need for in-service professional development to improve and retain high quality teachers and ensure high standard of teaching and learning is undeniable.

Teacher professional development

Teacher professional development is one of the important strategies for addressing the challenge of teacher quality. The Organization for Economic Cooperation and Development (OECD) defines teacher professional development as the activities that develop a teachers' knowledge, skills, expertise and other desirable characteristics of a teacher (OECD, 2009). It is a long-term process that involves systematic provision of opportunities for growth and development in the profession focused at improving teacher competency (Villegas-Reimer, 2003). It involves critically examining teaching, attending workshops, professional meetings, mentoring and reflection sessions, sharing with other teachers, reading publications and thereby gaining valuable experiences in the profession (OECD, 2009; Villegas-Reimer, 2003).

Competency based models are increasingly being used to design high quality professional development programs as they clearly defines the desirable competencies in terms of the knowledge, personal capabilities, skills, attitudes and traits that jointly enable an individual to perform their jobs at the desired standards of performance (Lucia and Lepsinger, 1999; Marrelli et al., 2005). Marrelli et al. (2005) further notes that competencies are measurable capabilities, the building blocks for effective work performance, and most tasks requires a combination of competencies to be executed (p. 534). Therefore, for organizations competencies of employees for specific work (Chouhan and Srivastava, 2014; Rozdi et al., 2016). Consequently, to succeed, they must identify, nourish and utilize the

a competency-based model is an important tool in teacher professional development initiatives as it informs those competencies that will be addressed for improving the teacher classroom practices.

Studies have shown that changes in pedagogy have the strongest effect on student performance (Conn, 2014). Furthermore, the most effective pedagogical intervention programmes are those that provide teachers with opportunities to; focus on what students are expected to learn, reflect on their practices, identify challenges that need to be addressed, try out new teaching approaches, and offer follow-up mentoring support (Ingvarson et al., 2005). Therefore, changes in teacher practices are not incidental but occur through systematic engagement in discussions, collaborations, and reflections that enables a deeper understanding of their pedagogical practices (Schrum and Levin, 2012). Consequently, pedagogical interventions for teacher professional development are more likely to have better outcomes when the teachers are engaged in identifying areas where they need improvements and they have opportunities to choose what to improve on. From the foregoing, it is evident that teacher mentoring has the potential to improve teacher classroom practices as it focuses on the specific context of each individual teacher.

Teacher mentoring

Teacher mentoring is not well understood and despite the many mentoring programmes in teacher education, there is little consensus on the exact meaning of a mentor (Koki, 1997). It is common to find them being referred to as supervisors, coaches, and peer trainers (West, 2016; Koki, 1997). Furthermore, there is little consensus on the actual role that mentors play or what distinguishes mentoring from other forms of teacher support, and even how the mentoring process is managed (Cullingford, 2016; Rebecca, 2016; Martin, 2006). However, there are common threads across different schools of thought that collectively provide an understanding of what teacher mentoring constitutes. It is a professional development strategy where a mentor who is more experienced in classroom instruction, support a teacher in improving their classroom practices by devising interventions customised to the needs of the specific teacher (Nel and Luneta, 2017; Australian Council for Educational Research, 2016). It is a formal relationship for supporting and encouraging professional learning that is based on trust between the mentor and the teacher (State Government of Victoria, 2010). Teacher mentoring is a flexible process, allowing teachers to challenge themselves in ways that are specific to their diverse needs based on their context (Collet, 2016). The structure, content, duration, and intensity of the mentoring program varies widely from a single one off meeting between a mentor and a teacher to frequent

highly structured meetings over several years (Ingersoll and Strong, 2011).

In teacher mentoring, the mentor conducts classroom observations, hold a meeting with the teacher to reflect on the observations, and support the teacher in identifying strategies for improvement on areas that were found to be challenging (American Institutes for Research, 2020; Australian Council for Educational Research, 2016; Holloway, 2001). Furthermore, mentors develop trustful relationships with the teachers that create an environment for instructional improvement (Irby et al., 2017). The overriding objective of the mentoring process is to advance a teacher to the proficient and expert levels of teaching (Wasonga et al., 2015). Meanwhile, the mentors need appropriate training and opportunities for discussing ideas, problems and solutions with other mentors (Holloway, 2001).

Effects of teacher mentoring

Teacher mentoring is associated with improved teacher retention rates and improved pedagogical skills (National Foundation for the Improvement of Education, 1999). It has a positive impact on teacher commitment, classroom instructional practices, and student achievement (Ingersoll and Strong, 2011; Australian Council for Educational Research, 2016; Amin et al., 2018; Ochanji et al., 2017). This is because mentoring is an empowering process that enables teachers to learn from their professional colleagues, reflect on their beliefs about teaching, and improve their classroom practices through gradual integration of theory and practice (State Government of Victoria, 2010; Arnesson and Albinsson, 2017). Aside from the teachers, the mentors also benefit from the mentorship process in terms of self-satisfaction derived from helping others, earn respect, nurture collaboration, and gain new ideas (Holloway, 2001; Ochanji et al., 2017; Wasonga et al., 2015).

Classroom practices

Classroom practices have the greatest contribution to student learning outcomes because the classroom is the venue where students and teachers interact and decisions as to what to do in this venue most strongly affect student learning outcomes (Wenglinsky, 2001). Classroom practices are those teaching and learning activities and interaction processes within a classroom system that enable contextualization of the content that is taught and learnt (Li and Oliveira, 2015). Wenglinsky (2001) identifies 21 specific classroom practices in high school mathematics classrooms, while Li et al. (2015) identifies eight themes of classroom practices. Classroom practices are characterized by elements and processes of teaching, with the elements being the goals,

objectives, tasks, discourse, and interactions, while the processes are the planning for instruction, implementation of the plan, assessment, and reflection (Kahan et al., 2013). Therefore, effective classroom practices should focus on the intersection of the elements and processes of teaching and learning.

Planning for instruction within a specified time duration in a classroom calls for a teachers' competence in planning for learning objectives, appropriate instructional resources, interactions, and innovative learning activities (Marzano, 2005; Broemmel et al., 2016; Price and Nelson, 2014; Jackson, 2011). Innovative learning activities are a critical determinant of good classroom practice and their use improves classroom practice (Hirsch and Supple, 1996; Bleakley and Carrigan, 1994; Herr, 2001). Such innovative activities include incorporating learners' previous experiences in planning for a lesson, use of locally available resources, use of project-based learning, and encouraging learners to apply knowledge and skills in solving problems in their surroundings (Herr, 2001; Bleakley and Carrigan, 1994; Sharma, 2016). Furthermore, ability to meaningfully engage learners through the learning activities, questions and answer interactions, experimentation, as well as practical activities defines good classroom practice. Furthermore, formative assessment and use of assessment results to improve learning, nurtures a culture of continuous improvement in the teaching profession (Heritage, 2010; Tuttle, 2009). The various classroom practices that teachers adopt in engaging with learners play an important role in student understanding of concepts and learning outcomes (Ottevanger et al., 2007).

Statement of the problem

The low learning outcomes at primary school grades in the remote and rural areas of Kenya is acknowledged as a challenge. This is mainly attributed to teacher quality as studies show low subject content knowledge and pedagogical content knowledge among primary school teachers in Kenya. In attempts to address this challenge, an intervention was implemented in Kwale County that aimed at improving teacher classroom practices, and student learning outcomes. A key component of this intervention was teacher mentoring to improve their classroom practices. Based on evidence from other contexts, it was assumed that this strategy would improve literacy outcomes for early grade learners. There is limited evidence in Kenya on the effectiveness of teacher mentoring as a strategy for improving teacher classroom practices. Specifically, there is no evidence on the effectiveness of teacher mentoring in improving classroom practices of primary school teachers in Kwale County of Kenya. Therefore, this study sought to determine the effects of teacher mentoring on the

classroom practices of primary school teachers in Kwale County, Kenya.

Research objectives

The objectives are to:

- (i) Determine whether teacher mentoring was an effective strategy for improving teacher classroom practices
- (ii) Determine the duration of teacher mentoring that was more effective in improving teacher classroom practices
- (iii) Establish the positive experiences from the teacher mentoring process
- (iv) Establish challenges experienced from the teacher mentoring process

Objective 'a' was measured by assessing teacher classroom practices over a period of 20 months from May 2016 to October 2018. A classroom observation tool was used to assess the classroom practices of the same teacher over this period and the mean classroom practice scores for each year were analysed to determine whether there were significant changes in their practices. Objective 'b' was measured by comparing the mean classroom practice scores obtained in 2016 with that of 2017, and the mean score obtained in 2017 with that of 2018. Comparisons of the mean classroom practice score were done year by year to determine any significant differences. Objectives 'c' and 'd' were assessed by conducting teacher surveys each year during school monitoring visits by the study team to establish the positive experiences and challenges encountered by the teachers in the mentorship intervention.

Research hypotheses

The study was premised on the null hypotheses that:

- i) H_1 : teacher mentoring does not significantly affect teacher classroom practices
- ii) H_2 : duration of teacher mentoring is not a significant factor on teacher classroom practices.

Conceptual framework for the study

The study adopted the systems theory in education which depicts the teaching and learning process as having inputs that interact to produce outputs (Ayot and Patel, 1992). The elements of a teaching and learning system are illustrated in Figure 1. The conceptual framework for the study was adopted from Ayot and Patel (1992) who posits that all systems have common characteristics which includes; the set goals, elements that work

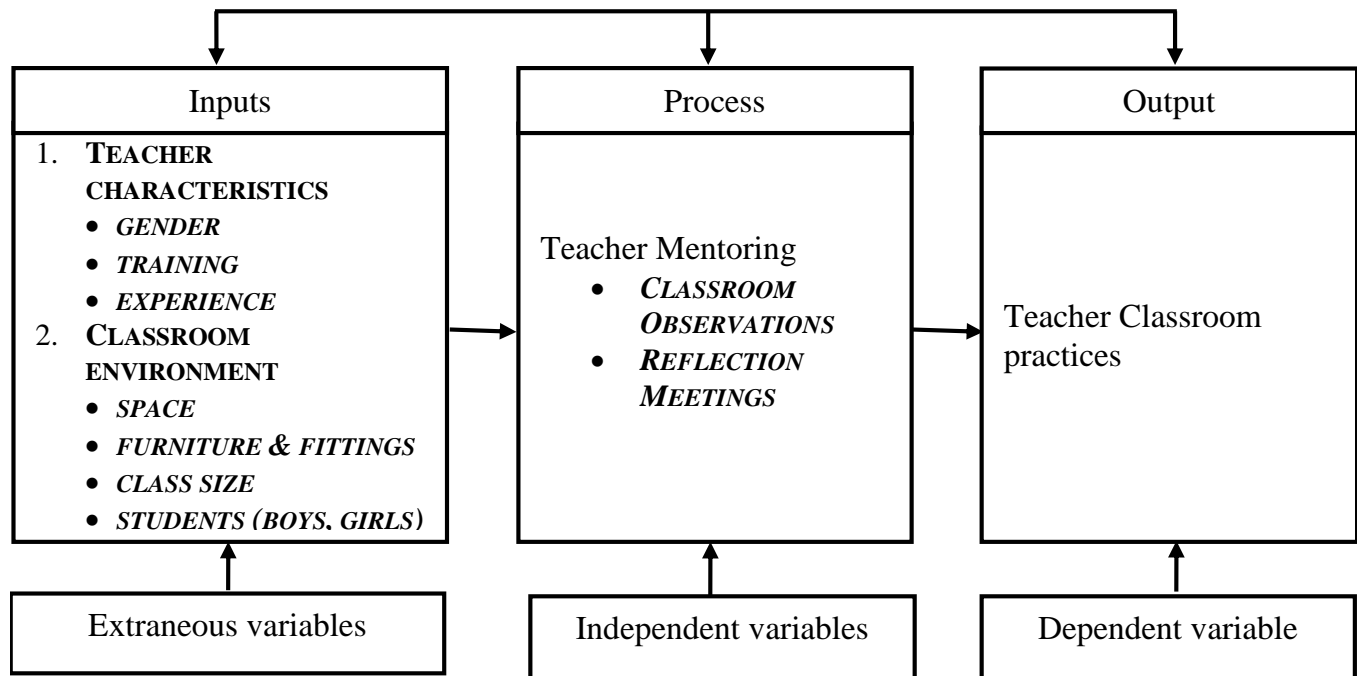


Figure 1. Conceptual framework for the study.

harmoniously, and feedback. Specific to teacher mentoring, the teacher is the input and through the mentoring process, teacher undergoes desirable changes in their pedagogical practices. The performance of the teacher in classroom practice is the output which provides feedback about quality of the teaching-learning process. Therefore, by manipulating the classroom practices through adopting the teacher mentoring intervention, it is possible to produce desirable outputs in the form of improved teacher classroom practices. The extraneous variables in this study were teacher characteristics and classroom environment. To control for the teacher characteristics, only trained teachers with more than two years of teaching experience in 22 public primary schools in Kwale County were involved in this study. This controlled for training and experience of the teacher. To control for classroom environment, the schools selected for the study were visited at the beginning of the project to ascertain that they had adequate classrooms and comparable student enrolment in terms of class sizes and gender.

METHODOLOGY

One group repeated measures design

The study was designed as an experiment aimed at determining the effects of teacher mentoring on their classroom practices. Teacher mentoring was the independent variable while the classroom practice score was the dependent variable (Best and Kahn, 2003;

Wiersma, 2000; Robson, 2002). The study was conducted in a school context and it was not possible to establish experimental and control groups of teachers as the school management and education authorities in Kwale County could not allow randomization of teachers for the purpose of the study. Thus, the study adopted One Group Repeated Measures Design (Table 1) as quasi-experiment and followed one cohort of 40 teachers during the duration of 20 months of the study from May 2016 to October 2018 in 22 public primary schools. This design was found appropriate as it required fewer participants and resources. Furthermore, observing the same teachers, multiple times as they taught in their classrooms minimized variability. In Table 1, the symbol 'O' represents the classroom observations that were conducted using a classroom observation tool to assess the teacher classroom practices, which was the dependent variable. In 2016, each teacher engaged in the study was observed at least twice, in Term 2 (May to July) and Term 3 (September and October) and therefore, O_1 represents the average classroom practice observation score for all teachers that were observed in 2016. Likewise, O_2 and O_3 represent the average classroom observation score for classroom observations that were conducted in 2017 and 2018 respectively. The symbol 'X' represents the teacher mentoring sessions, which are the treatments or independent variable in this intervention that were conducted for each teacher immediately after each classroom observation. Therefore X_1 , X_2 and X_3 represents teacher mentoring sessions that were conducted in 2016, 2017 and 2018 respectively.

Selection of schools and teachers

The target population in this study were 864 lower grades (Grades 1 to 3) public primary school teachers in 392 public primary schools in Kwale County Kenya. The accessible population was 121 lower grade teachers in 22 public primary schools in Kwale County, Kenya. The lower grade teachers were considered appropriate for

Table 1. One group repeated measures design.

Group	2016		2017		2018	
40 primary school teachers	O ₁	X ₁	O ₂	X ₂	O ₃	X ₃

this study because the overall goal of the intervention was to improve classroom practices of lower grades teachers as a strategy for improving literacy outcomes for lower grades learners. Purposive sampling was adopted in the selection of the 22 out of the 392 public primary schools in Kwale County. The criteria used in the selection of the schools were; a public school, willingness of the school management to participate in the project, geographical proximity to other project schools within a certain radius for engaging teachers in trainings and meetings in a cluster, number of students enrolled in the school, and approval by the local education authorities for participation of the school. A list of the public primary schools in Kwale County was obtained from the County Education Authorities and the 22 primary schools were selected using the criteria. The selected schools had comparable characteristics in terms of student enrolment, staffing, and school infrastructure. The average school enrolment was 720 students with an average class size of 51 students per class in lower grades. It was estimated that three lower grade teachers would be targeted for mentoring in each of the schools. All the 121 teachers who were selected to participate in the study were professionally qualified with a minimum of a primary school teacher training certificate. In addition, all the teachers had a minimum teaching experience of at least two years. In 2016, a total of 59 teachers were observed and mentored, while 68 and 71 teachers were observed and mentored in 2017 and 2018 respectively in the 22 schools. During the duration of the study, some of the teachers were not reached because they were; absent on the day of school visit, transferred to non-study schools, re-assigned to teach upper grade classes within the same school. These teacher dynamics reduced the sample size of teachers that was consistently observed and mentored across the three years from the expected 121 to 40 teachers. However, this final sample of 40 lower grade teachers was considered appropriate for statistical inferences.

In addition to the teachers, 15 mentors, comprising of five Curriculum Support Officers (CSOs) and 10 experienced teachers were selected to provide the mentoring support for the target teachers. The main criteria used for the selection of the 10 teachers as mentors was; teaching experience of at least 10 years, performance in teaching based on observations by the head teachers in their schools, participation in previous teacher professional development programmes, and approval by the local education authorities in Kwale County. Meanwhile, the five CSOs were government education officials with a mandate in teacher professional support in Kwale County. The inclusion of the 10 teachers as mentors in this intervention was informed by the few numbers of CSOs in Kwale County against the number of teachers that required to be mentored regularly.

Data collection instruments

A classroom observation tool and an open-ended interview guide were used for data collection. The classroom observation tool, self-developed by the researchers with 16 items was used in the classroom observations. The 16 items were specific classroom practices that were categorized into two domains; classroom environment (five items) and teaching and learning process (eleven items). Each of the classroom practice had five performance descriptor statements that were assigned a score of 1 to 5, with 1

indicating the lowest level of performance for the specific classroom practice, while 5 was the highest level of performance of the classroom practice. During the classroom observation, the teacher was scored on the 5-point rating scale from 1 to 5 for each classroom practice. Therefore, the total possible score was 80 scores which were expressed as a percentage. Table 2 illustrates a learner engagement item which was one of the classroom practices that was assessed in this study.

The classroom observation tool was evaluated by members of the study team and education specialist to ascertain its content validity. These experts are specialists in classroom instruction and teacher mentoring with wide experience in teaching of over 10 years. They ascertained that the items in the classroom observation tool were aligned with the desired teacher classroom practices and were based on sound teaching and learning theories (Gravells and Simpson, 2014). The reliability coefficient of the classroom observation tool was determined using the Cronbach's Alpha in SPSS Version 22 and achieved a reliability coefficient of 0.84, 0.81 and 0.79 in 2016, 2017 and 2018 respectively. An open-ended interview guide was used to gather qualitative information from the teachers, mentors, and head teachers on their experiences of the mentoring intervention. Using this guide, both positive experiences and challenges were gathered from these cadres of staff through surveys during eight school monitoring visits that were conducted by the study team in each of the 22 schools from 2016 to 2018.

Data collection procedures

The study was part of an intervention that was implemented in partnership with the education authorities in Kwale County of Kenya. Therefore, classroom observations were part of the intervention and informed the mentoring sessions that were conducted with each teacher after the classroom observation. Furthermore, the study team worked collaboratively with the education authorities in Kwale, but nevertheless, always sought for authorisation from the education authorities for the school visits.

As part of the intervention, each school was provided with 12 Clamshell Laptops that were pre-loaded with digital stories in English and Swahili languages for use in teaching of early grade literacy. The stories had earlier been developed by teachers and were aligned with the national curriculum in Kenya for the lower grade learners. A local technology company in Kenya was engaged for digitization and illustration of the stories. The target teachers were trained on how to integrate the digital stories in their teaching of early grade literacy. However, rather than conducting a one-off workshop, the teachers were trained in a series of workshops for six days, spread across six weeks from March to April 2016. This approach, which was dubbed the 'drip-feed approach', was meant to enhance understanding and uptake of the intervention, enabling teachers sufficient time to digest and reflect on what they were trained on before the next session. The training was followed up with school visits where the target teachers were visited, observed as they taught in their classrooms, and held discussion sessions thereafter.

Meanwhile, 15 mentors, comprising of five Curriculum Support Officers (CSOs) and 10 experienced teachers were selected and trained by the study team on the content and application of the

Table 2. Learner engagement.

Learner Engagement				
Are most children engaged in learning activities most of the time? Are children spending a lot of time waiting for instruction from the teacher? Does the teacher leave them unattended while s/he is busy with other tasks?				
1	2	3	4	5
Most learners are not engaged in any learning activities throughout the lesson	Most learners are engaged in learning activities for less than 25% of the time they are in the classroom	Most learners are engaged in learning activities for about 50% of the time they are in the classroom	Most of the learners are engaged in learning activities for about 75% of the time that they are in the classroom.	Almost all children are engaged in learning activities almost always – more than 75% of the time that they are in the classroom

classroom observation tool and the process of teacher mentoring. The teacher mentors had previous experience as teacher mentors. Under the guidance of the researchers in this intervention, the mentors prepared monthly schedules for school visits, conducted 20 monthly teachers mentoring school visits, and observed 238 classrooms. The mentors were assigned specific teachers in one to two schools within their vicinity for accessibility. On average, each of the 40 teachers was observed and mentored six times during the project duration. The mentors were supported by the study team with a daily rate for transport and meals as they were required to travel further away from their regular working stations. The study team conducted review and reflection meetings with the mentors every month after the school visits to share their observations, challenges and plan for the next round of classroom observations and mentorship sessions. These meetings were critical in enabling quality assurance by ensuring consistency and objectivity in classroom observation and teacher mentoring sessions thereby reducing variability. Furthermore, during these meetings, the mentors shared ideas based on their observations, discussed lessons learnt and best practices in the mentoring process, which enhanced their capabilities as teacher mentors.

During the school visits, the teacher mentors conducted classroom observations as the teacher taught a class in lower grade. The duration of classroom observation ranged from a single lesson to a series of lessons consecutively for one teacher depending on identified need and time availability. During the classroom observation, the mentor scripted their observations on notebooks. Soon after the observation, the teacher and mentor held a session where they discussed the observations. Importantly, the study team had decided that the classroom observation and teacher mentoring would not narrowly focus on the teacher integration of ICT in the lesson, but rather focus on the overall teacher classroom practice. The understanding was that ICT tools and ICT integration were meant to enhance overall teacher classroom practices and their integration was not an end in itself but part of the overall process of improving classroom practices. This decision had also informed the development of the classroom observation tool. However, as part of the classroom practices, there were specific items that addressed integration of ICT in teaching and learning.

During the mentoring sessions that were conducted soon after the classroom observation, the teacher and mentor first identified the good practices observed during the lesson and thereafter focused on the practices that needed to be improved. As part of the mentoring process, the mentors had opportunities to conduct demonstrations on how some of the practices that were challenging to the teacher could be better applied in the classroom. After the mentoring session, the mentor completed the classroom

observation tool by rating the practices as observed. They shared the completed tool with the study team who entered the data on an excel template prepared for this purpose. Overall, each of the teachers were observed and mentored at least six times throughout the duration of the project. As part of the mentor training, emphasis was laid on the need for the mentors to nurture a professional relationship with the teacher based on trust and mutual respect.

Data analysis

Data that was collected using the classroom observation tool was consolidated into an excel template, cleaned and imported into SPSS version 22 for analysis by the study team. The classroom observation tool had 16 items that were statements of specific classroom practices. The teacher mentors were required to rate each practice on a scale of 1 to 5, with 1 being the lowest level of performance for the specific classroom practice, while 5 was the highest level of performance. The ratings for all the items were summed up to obtain a composite score with a total possible score of 80 which was expressed as a percentage. A high score indicated high classroom practice, while a low score indicated low classroom practice.

The study adopted the One Group Repeated Measures Design and followed one cohort of 40 teachers during the duration of 20 months of the study from May 2016 to October 2018 in 22 primary schools. An average classroom practice score was computed for 2016, 2017 and 2018 providing three data points for conducting the Repeated Measures ANOVA. However, before commencing on data analysis, the researchers tested the five assumptions of Repeated Measures ANOVA to ensure that the results obtained were valid. Meanwhile, the information gathered using the interview guide was subjected to content analysis and categorized into emerging themes in two main categories of positive experiences and challenges.

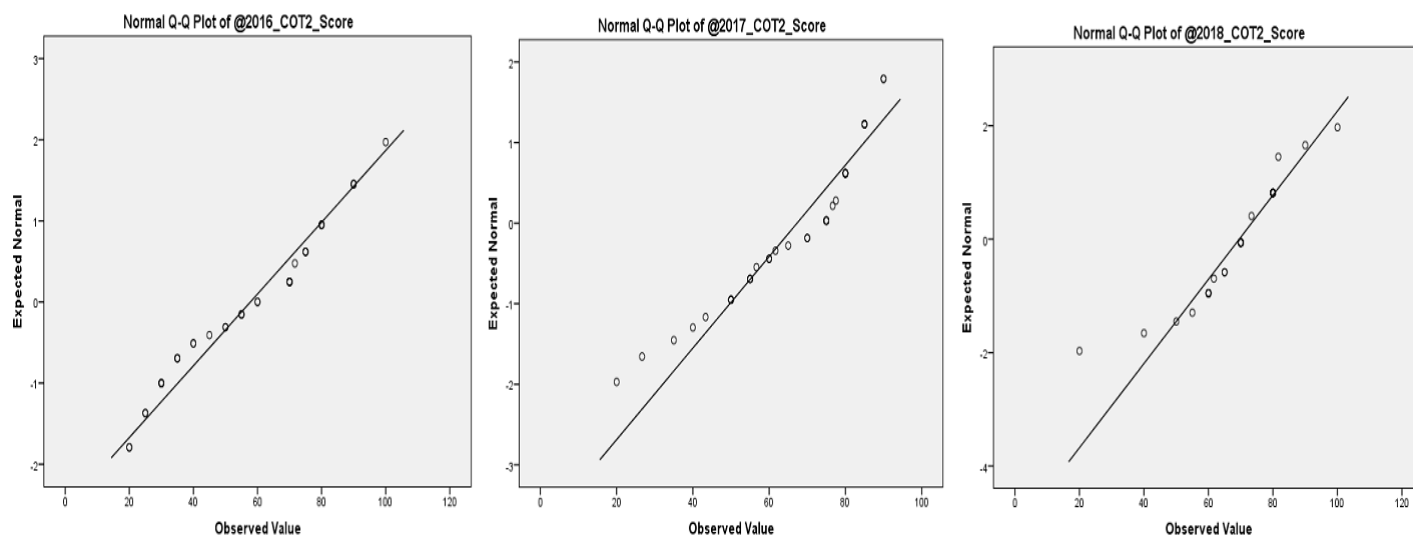
RESULTS

Testing assumptions of repeated measures ANOVA

The first assumption requires that the dependent variable is continuous, and this assumption was met as the classroom observation score was a continuous variable. The same group of 40 teachers in Kwale County were observed three times; in 2016, 2017, and 2018. Therefore, the second assumption of least two

Table 3. Classroom observation mean score and 5% trimmed mean score.

Year	Observed mean	5% trimmed mean
2016	57.79	57.82
2017	67.31	68.50
2018	69.54	70.32

**Figure 2.** Test of normality.

categorical related groups for conducting Repeated Measures ANOVA was met. Table 3 shows that the observed mean scores and 5% trimmed mean scores for each year was comparable and therefore the third assumption of no significant outliers was met. The Normal Q-Q Plot was used in testing the assumption of Normality. The results are presented in Figure 2 which shows that the data for the three years (2016-2018) does not deviate significantly from the diagonal, and therefore the fourth assumption of normal distribution was met. The fifth assumption for Repeated Measures ANOVA tested the equality of variance differences between related groups using the Mauchly's test of sphericity. The results in Table 4 shows that there were no significant differences in the variances between groups and the Mauchly's test of sphericity was not violated at $\chi^2(2) = 2.623, p=0.269$ and the assumption was upheld.

Effect of teacher mentoring on classroom practices

The first null hypothesis (H_{01}) in this study tested the effect of teacher mentoring on classroom practice score. The mean classroom practice score was computed for each year from 2016 to 2018. The results are presented

in Table 5 which shows that the mean classroom practice score improved across the three years from 2016 to 2018. To determine whether the observed classroom practice mean score differences across the three years were statistically significant, One Group Repeated Measures ANOVA was carried on the classroom practice scores for 2016, 2017 and 2018. The results are presented in Table 6 which shows that teacher mentoring had a statistically significant effect on classroom practice score at $F=6.282, df=2, p=0.003$ with a moderate effect size. Therefore, the null hypothesis is rejected and in conclusion, teacher mentoring was found to be an effective intervention in improving the classroom practices of the lower grade primary school teachers in Kwale County, Kenya.

Effect of duration of teacher mentoring on classroom practices

The second null hypothesis (H_{02}) in this study tested the effect of the duration of teacher mentoring on the classroom practice score. Therefore, LSD post hoc pairwise comparisons test was conducted on the mean classroom practice score for 2016, 2017 and 2018 to

Table 4. Mauchly's test of sphericity.

Within subjects effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon ^b		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Mentoring	0.933	2.623	2	0.269	0.937	0.983	0.500

Table 5. Mean classroom practice score 2016-2018.

Mentoring	Mean	Std. error	95% Confidence Interval	
			Lower bound	Upper bound
2016	57.792	3.575	50.560	65.023
2017	67.313	2.785	61.680	72.945
2018	69.542	2.131	65.232	73.852

Table 6. Tests of within-subjects effects for classroom practice score.

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Mentoring	Sphericity assumed	3115.706	2	1557.853	6.282	0.003	0.139
	Greenhouse-Geisser	3115.706	1.875	1661.749	6.282	0.004	0.139
	Huynh-Feldt	3115.706	1.966	1584.568	6.282	0.003	0.139
	Lower-bound	3115.706	1.000	3115.706	6.282	0.016	0.139

locate the significant differences across the three years. The results are presented in Table 7 which shows that there are significant differences in mean classroom practice score between the years 2016 and 2017 in favour of year 2017, and between years 2016 and 2018 in favour of year 2018. However, there was no significant difference between the years 2017 and 2018. While there were significant differences in the classroom practice score in the first year of teacher mentoring from 2016 to 2017, there were no significant differences in the second year of teacher mentoring from 2017 to 2018. Therefore, the null hypothesis is rejected. In conclusion, an additional year of teacher mentoring after the first year of teacher mentoring does improve their classroom practices. This could imply that a one-year teacher mentoring intervention is sufficient to improve their classroom practices. This finding could imply that an effective teacher mentoring programme should devote effort and resources in a one-year programme as subsequent additional year do not appear to produce significant results on the teacher classroom practice. Figure 3 illustrates the estimated marginal mean of classroom practice score across the three years which further shows that after a rapid improvement of the classroom practice between year 1 (2016) and year 2 (2017), the improvement slowed down between year 2

(2017) and year 3 (2018). This finding has implications on providers of teacher mentoring services as it could indicate that a one-year duration is a viable and effective teacher mentoring programme.

Positive experiences from the teacher mentoring process

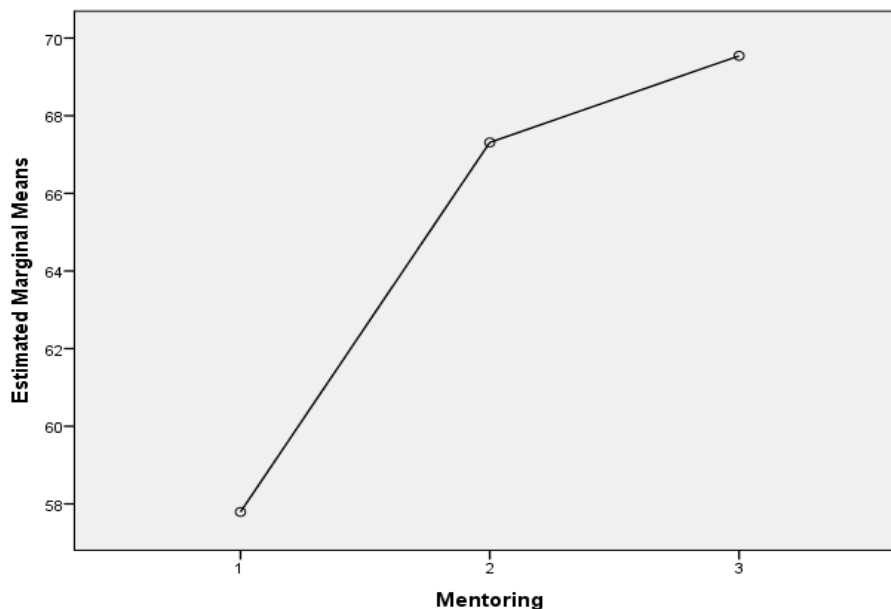
Information was gathered through interviews on the emerging positive experiences from the teacher mentoring intervention. The following are some of the positive experiences that were observed:

(i) Increased collaboration: The mentoring process enhanced the practice of sharing of ideas between teachers, schools and school clusters. Teachers within supported schools became more open in sharing about their teaching and this improved teaching in the school. Meanwhile, the mentors picked up good practices observed during the mentoring sessions and shared them with teachers and mentors. For instance, one teacher started conducting library sessions for her learners using Laptops that were pre-loaded with digital stories and this idea increased learners' interest in reading. The idea was soon picked up and spread across other schools through

Table 7. Pairwise comparisons of mean classroom practice score 2016-2018.

(I) Mentoring	(J) Mentoring	(I-J) Mean difference	Std. error	Sig. ^b	95% Confidence interval for difference ^b	
					Lower bound	Upper bound
1	2	-9.521 [*]	3.845	0.018	-17.298	-1.743
	3	-11.750 [*]	3.614	0.002	-19.059	-4.441
2	1	9.521 [*]	3.845	0.018	1.743	17.298
	3	-2.229	3.059	0.471	-8.416	3.958
3	1	11.750 [*]	3.614	0.002	4.441	19.059
	2	2.229	3.059	0.471	-3.958	8.416

Based on estimated marginal means. ^aThe mean difference is significant at the 0.05 level.

**Figure 3.** Estimated marginal means of classroom practice score.

the efforts of the mentors. In another case, a teacher was using self-developed and relevant stories and songs in enhancing student engagement and this practice was soon shared among the teachers.

(ii) Demand for mentorship: In most supported schools, changes were noted in the teachers who were being supported by the mentors. The word spread to other unsupported schools and they too started making requests for mentorship support for their teachers.

(iii) Improved capacity of mentors: The monthly review and reflection sessions for mentors emerged as important forums where mentors openly shared their challenges and solutions were proposed. The best practices

experienced in the mentoring process were also shared and over time the mentors enhanced their capacity. Furthermore, it was observed that the mentors developed a sense of responsibility in their personal professional practices as pedagogical leaders.

(iv) Schools as learning hubs: Some schools came together and developed a learning programme where teachers could identify and visit a school that was doing well within their proximity to learn from other teachers. Such schools emerged as informal learning hubs largely driven by the initiatives of the teachers in such schools and this was attributed to the mentorship intervention.

(v) Support of education authorities: Education

officials including the quality assurance and standard officers and curriculum support officers supported the mentorship intervention including participation in the mentors' review and reflection meetings. They also led in coordinating the school visit schedules as well as the review and reflection meetings for mentors. This was critical; not only in the feedback they shared but also created a sense of legitimacy for the mentorship intervention among the mentors, schools and teachers.

(vi) Virtual communities of practice: Some teachers formed WhatsApp groups that brought them together for online sharing of soft copies of teaching and learning materials, ideas, and communication on emerging trends and developments in education including administrative matters.

(vii) Improved classroom practices: Supported teachers improved in their classroom practices over time. For instance, there were notable improvement in the classroom environment in terms of use of wall charts, manipulatives and other teaching and learning materials that enhanced learning. It was also noted that some teachers improved on their class management which led to improved student behaviour. Some teachers made phone calls to the coordinators of the intervention to express their satisfaction with the mentorship intervention as they had gained new ideas on how to address challenges they were facing in their teaching. The teachers also indicated that the mentoring intervention had motivated them to take personal responsibility for self-improvement in the teaching profession.

(viii) Trustful relationship: There was indication that teachers appreciated the friendly one on one interaction with the mentors, which was not judgemental but supportive.

(ix) Support by head teachers: Teachers reported that given the respect earned by the mentors, they shared their challenges with the mentors who would articulate them with the head teachers. The challenges were prioritised by the head teachers resulting in improved physical infrastructure, and provision of teaching and learning materials. This strategy also enhanced the head teacher's awareness of what was going on in the classes.

Challenges experienced from the teacher mentoring process

The following are some of the challenges experienced during the mentoring intervention;

(i) Coordination of school visits: initially, communications to schools about the school visits were not effective such that the head teachers or the target

teachers were not aware about the visit or in some instances were not available in the school. However, this challenge was addressed over time.

(ii) Availability of mentors: In some cases, the mentors had to do a balancing act between their own teaching responsibilities and teacher mentoring. Consequently, some of the mentors initially missed out on mentorship sessions. However, through the support of the coordinators and education officials, the monthly school visit schedules were aligned with the availability of the mentors.

(iii) Transport to schools: Although mentors were assigned schools within their vicinity, some of the schools were geographically widely spread and it took more time to reach such schools, and little time was available for the teachers and mentors to engage productively.

DISCUSSION

The quality of education in Kenya at the primary school level is low and several strategies have been initiated to address this challenge with mixed results. Teacher quality and their classroom practices are key determinants of learning outcomes. This study sought to determine the effectiveness of teacher mentoring as a strategy for improving classroom practices and by extension teacher quality. Despite the existence of many teacher mentoring programmes, there is still no clarity on exactly what teacher mentoring is and how it is distinct from other teacher pedagogical support interventions such as induction, coaching, and supervision among others. The teacher mentoring intervention was focused on teacher classroom practices. Therefore, the observations of teacher classroom practices were conducted in the classroom, which was the main venue where teaching and learning are transacted in this intervention. Furthermore, the teacher mentoring was a collaborative process between the teacher and mentor that focused on; classroom observation, review and reflection session, identification of classroom practices that required to be improved, and developing strategies to improve the challenging classroom practices. Therefore, the mentoring intervention adopted a flexible approach in the structure, content, duration and intensity of engagement between the teacher and mentor (Collet, 2016; Ingersoll and Strong, 2011).

Several studies have documented the benefits of teacher mentoring interventions and the contexts under which they work. However, there are few quantitative studies that demonstrate the effectiveness of teacher mentoring to improve their classroom practices. This study has established that teacher mentoring was effective in improving the classroom practices of teachers. This finding is in tandem with previous studies

which associated teacher mentoring with improved teacher pedagogical skills (National Foundation for the Improvement of Education, 1999). Furthermore, the study established that a one-year programme of teacher mentoring is adequate to improve their classroom practices.

Aside from improving the classroom practices, teacher mentoring has other benefits that are important in improving teacher quality. In this study, it was found that participating teachers became motivated and took personal responsibility for self-improvement in the teaching profession. This finding support earlier studies that associated teacher mentoring with improved teacher commitment in their work (Ingersoll and Strong, 2011; Australian Council for Educational Research, 2016; Amin et al., 2018; Ochanji et al., 2017). The commitment to self-improvement was observed in collaborative activities that were initiated by participating teachers including forming of virtual communities of practice through WhatsApp groups and learning visits to neighbouring schools. Through these initiatives, teachers started sharing teaching and learning materials and ideas. Some participating teachers developed innovative solutions for teaching and learning and their schools emerged as resource hubs where teachers from neighbouring schools visited for learning.

Aside from the teachers, the mentors also benefited from the intervention. Through the monthly mentors' review and reflection sessions, the mentors over time enhanced their capacity as mentors and developed a sense of responsibility as pedagogical leaders. This finding is collaborated with other studies that found that mentors also benefit from the mentorship process in terms of self-satisfaction derived from helping others, earn respect, nurture collaboration, and gain new ideas (Holloway, 2001; Ochanji et al., 2017; Wasonga et al., 2015).

The key enablers for the successful implementation of the mentorship intervention were the support by education authorities in Kwale County, who not only coordinated the school visit schedules but also actively participated in the monthly review and reflection meetings, as well as termly school monitoring visits to assess progress of the intervention. At the school level, success of the mentoring intervention was attributed to the supportive role of the head teachers who were keen to improve quality of education in their schools. Finally, the trustful relationships were established between the mentors and teachers who respected and valued each other as learning partners, a finding that collaborated with previous studies (Irby et al., 2017). Meanwhile, the success of the mentorship intervention in the supported schools created demand and teachers from other unsupported schools made requests for support. There were challenges in coordinating the school visits as the mentoring strategy was not a formalized school programme in Kwale County at the time of the study.

Furthermore, the absence of a formal mentorship programme in the schools meant that mentors had to individually balance between their teaching and mentorship roles which did not always work out perfectly.

RECOMMENDATIONS

The findings from this study will benefit key education stakeholders in Kenya and beyond in the design and implementation teacher mentorship programmes in schools. The following recommendations are made to the key actors in the education sector with a role in teacher professional development:

(i) Education policy makers: First, the findings will inform policy makers in the education sector in Kenya on planning for effective, efficient and sustainable teacher mentorship programmes as a strategy for teacher professional development for improvement of teacher quality. The mentorship programme should ensure that the teachers and mentors have sufficient time for engagements. Meanwhile, in order to ensure sustainability of the mentorship programmes, a formal structure should be established in teacher management for formal recognition of teacher mentors with commensurate compensation for this role. The programme should also include capacity building of the mentors to effectively deliver on their role.

(ii) Education practitioners and development partners: Secondly, education development partners and practitioners including teacher trainers and teacher training institutes will benefit on ideas for programming in the implementation of teacher professional development. Specifically, the findings will inform on implementation strategies particularly on the need to incorporate a comprehensive teacher mentorship component in every teacher professional development programme, and also the pre-requisite factors that need to be put in place as well as the challenges they are likely to encounter, and potential solutions in addressing them.

(iii) Education researchers: Evidence is limited on the effectiveness of teacher mentoring programmes in the developing countries and particularly on their potential for transforming teacher quality in rural and resource deficient settings. Therefore, the findings from this study will not only add into the existing body of evidence on this subject matter but will also form a basis for more discourse and work towards gathering of evidence on the effective models of teacher mentoring programmes in developing countries and their sustainability in the context of resource deficiencies.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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