TEACHERS' PROFESSIONAL DEVELOPMENT AND STUDENTS' ACADEMIC PERFORMANCE: A CASE STUDY OF COAST GIRLS SECONDARY SCHOOL IN MOMBASA COUNTY, KENYA

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ABSTRACT
The Teachers Service Commission (TSC) and Ministry of Education have been advocating for teachers' professional development for the purpose of improving students' academic performance. However, there is still no conclusive studies that show how teachers' professional development impact on students' academic performance. The research study therefore was designed to investigate whether there is a relationship between teachers' professional development and students' academic performance at Coast Girls Secondary School in Mombasa County, Kenya. The study employed *ex-post facto* research design. The target population was 852 respondents in Coast Girls Secondary schools in Mombasa County, Kenya. A purposive sampling method was used to choose the participants. The sample comprised of 116 Form 4 Biology students and 4 Biology teachers. The biology performance in 2017 Kenya Certificate of Secondary Examination was used as a measure of students' academic performance. The descriptive statistics used were mean and standard deviation to compare students' academic performance among the classes taught by the 4 teachers. ANOVA test statistics was used to test the hypotheses in the study, while Post-hoc Tukey's HSD test was performed to show where the significance differences existed among the independent variables. The hypotheses testing was done at $\alpha = 0.05$ level of significance. The data collected in this study was analysed using Statistical Package for Social Sciences (SPSS) computer programme version 20.0. The research findings established that there was a relationship between teachers' professional development and students' academic performance. It was therefore recommended that teachers should be encouraged to continue with professional development in order to improve students' academic performance. However, it was also noted that students' academic performance was low despite their teachers' professional development and therefore there is need for further research to investigate why students' academic performance remain low despite high level of teachers' professional development.
Keywords: Teaching experience, Content knowledge, Teaching skills, In-service training

INTRODUCTION

Education is the instrument for economic empowerment and development of sustainable economy and plays rudimentary role in our society. National educational goals aim at acquisition of appropriate skills and development of mental, physical and social abilities and competencies as equipment for the individual to live and contribute to the development of the society (Bonney et al., 2015; KICD, 2015). These requirements call for highly trained teachers to assist students achieve high academic performance in learning institutions.

Professional development is formal in-service training to upgrade the content knowledge and pedagogical skills of teachers. It is widely viewed as an important means of improving teaching and learning standards (Meichen et al., 2017). The professional development that is required goes far beyond the one-shot workshop approach that has been widely criticized. Professional development includes intensive in-service, follow-up group sessions, and coaching of individual teachers (Quint, 2011). Kubitskey et al., (2004) points out that there are four components of quality professional development which are supported through plan, structure, community, and activities. The planning of quality professional development begins with well-defined goals of what the professional development is to be and allows for continual assessment of the professional development in order to adapt and improve. According to Kubitskey et al. (2004), the structure is internally consistent and contextualized around the needs of the teachers in their classroom, creating learner-cantered environments.

Professional development which extends over a long period of time allows creation of communities and teacher participants to emerge and develop as leaders within the communities. Gene (2000) points out that quality professional development also includes activities which allow for occasions for active learning of content. According to Ogbonnaya (2007), teachers' professional development refers to the opportunities offered to practicing teachers to develop new knowledge, skills, approaches and dispositions to improve their effectiveness in their classrooms. It is advancement that enhances teachers' knowledge of the students, the subject matter, teaching practices, and

education-related legislation (Professional Affairs Department, 2005). It also includes use of ICT and counselling interventions in teaching and learning activities (SMASE, 2017; Thuo, 2008).

Kwang *et al* (2008) argues that professional development affects student achievement through three steps. First, professional development enhances teacher knowledge, skills, and motivation; second, better knowledge, skills, and motivation improve classroom teaching. Third, improved teaching raises students' achievement. If one link is weak or missing, better student learning cannot be expected. If a teacher fails to apply new ideas from professional development to classroom instruction, students will not benefit from the teacher's professional development. The effect of professional development on students learning is possible through two mediating outcomes; teachers' learning, and instruction in the classroom.

Research studies show contradiction effect of teachers' professional development on students' academic outcome. According to UNESCO (2006), researches from developed countries show that quality of teaching is an important factor that may affect educational outcomes among both advantaged and disadvantaged students. Literature reviewed by Linda (2000) shows that differential teacher effectiveness is a strong determinant of differences in student learning, far outweigh the effects of differences in class size and heterogeneity in Dallas, USA. The data from Dallas shows that students who were assigned to several ineffective teachers in a row had significantly lower achievement and gains in achievement than those who were assigned to several highly effective teachers in sequence (Linda, 2000).

According to Meichen *et al* (2017), studies of teacher quality in developing countries show that differences in teacher quality can significantly impact student achievement. One such study in Peru found that teachers with high achievement in mathematics increased student achievement in standardized mathematics tests. Kahle and Fargo (2007) provides evidence that teacher participation in effective, sustained, professional development and subsequent use of standards-based instructional strategies have a positive impact on their students' performance in science. However, other studies show that teacher professional development has no effect or has insignificant effect on students' academic performance.

Meichen *et al.,* (2017) in their research finding carried out in rural china, found out that there was no effect of teachers' professional development on students' mathematics achievement in rural China. Bonney *et al* (2015) study that investigated the relationship between the quality teachers and students' academic performance in Sekondi Takoradi Metropolitan Assembly (STMA) Junior High Schools, revealed that even though the quality of teachers was high in terms of their academic and professional qualifications, it did not reflect much in the performance of the students. Study in Texas by Deidre (2013) indicates that 4th grade science, teacher professional development participation in curriculum, instruction, and differentiation credit strands increased the chances for students to score above the district median on Curriclum Based Assessments (CBAs). However, the larger number of professional development hours in a variety of credit strands had a negative impact on student achievement in 4th grade science.

Mahulo (2012) study that had a sample consisting of 58 trained and 49 untrained teachers, shows that teachers training alone does not contribute much to the students' academic performance in Gem District, Kenya. The present research study was designed to investigate whether there is a relationship between teachers' professional development and students' academic performance in Coast Girls Secondary School in Mombasa County, Kenya.

Education is the driving force in achieving the economic pillar of vision 2030 that seeks to improve lives of all Kenyans by achieving a 10% gross domestic product (GDP) growth rate. In an effort to achieve this objective, Teachers' Service Commission has been emphasising on teacher professional development to improve on academic perforce of students in secondary school in Kenya. Professional development is multifactor and includes higher academic achievement, workshops and seminars in dealing with students, training as examiners and related school management courses. However, it is not known if there is a relationship between teachers' professional development and students' academic performance in Coast Girls Secondary school. This study was set to investigate whether teachers' professional development has a significant relationship with students' academic performance in Biology at Coast Girls Secondary School in Mombasa County, Kenya.

The study investigated whether there was a relationship between teachers' professional development and students' academic performance in Coast Girls Secondary school in Mombasa County, Kenya. The hypothesis tested was that there is no statistically significant relationship between teachers' professional development and students' academic performance in biology at Coast Girls Secondary School in Mombasa.

METHODOLOGY

The study employed *ex-post facto* research design and this was because the researcher did not have a direct control of independent variables or dependent variables. The independent variables were not manipulatable because the researcher identified teachers according to their level of professional development that already existed and the researcher did not assign students to the teachers. The target population was 852 respondents in Coast Girls Secondary School. Purposive sampling method was used to identify the participants.

Biology teachers were used because the researcher identified among them their varied level of professional development and the fact that four of them were handling Form 4 classes that they had taught since Form 1. The Form 4 students were placed in their present classes randomly at Form 1 as they reported and new students were also randomly assigned to classes where vacancies existed. Teachers were also randomly assigned to their classes long before the students reported in Form 1.

The samples comprised of four teacher and 116 Form 4 students. Teachers were identified and corded as follow: teacher R, had attended only three seminars in Strengthening of Mathematics and Science Education (SMASE), was a graduate, in job group L and had job experience of 5 years; teacher G, was also a graduate, had attended all SMASE seminars since 2004, was in job group M and had teaching experience of 24 years; Teacher K was a graduate, had attended all SMASE seminars, is an experienced examiner in Biology, has taught both in post-secondary institution and secondary school, was in job group L and had teaching experience of 24 years; teacher T, had post graduate degrees, attended all SMASE seminars and was an examiner in Biology, was trained in education administration, was in job group N and teaching experience of 22 years. Teachers were therefore classified as follows; Teacher T had the highest provisional development, followed by teacher K, then teacher G and teacher R had the lowest teacher professional development. Kenya Certificate of Secondary Education (KCSE) 2017 biology result was used as the indicator for students' academic performance. The score ranges from 1 to 12.

The lowest score a student could score was 1 and the highest was 12. The KCSE examination is a standardised examination set and marked by Kenya National Examination Council (KNEC) trained examiners. The data collected from the field was analyzed using descriptive statistics; mean and STD. Inferential statistics used were ANOVA to test hypothesis and Post-hoc Tukey's test was used to reveal where the differences between the mean existed among the variables. The data in the study was analyzed using statistical package for social sciences (SPSS) computer programme version 20.0.

RESULTS AND DISCUSSION

The Null hypothesis sought to find out whether there is a relationship between teachers' professional development and students' academic performance in biology at Coast Girls Secondary School in Mombasa County, Kenya. Data was collected from biology teachers and KCSE 2017 Biology results. The data was analysed using (SPSS) computer programme version 20.0 and generated the results summarised in Table 1.

Table 1. Students' academic performance according to their teachers

	Teacher R class	Teacher G class	Teacher K class	Teacher T class
Mean	2.06	1.81	2.14	2.28
N	34	32	28	32
Std. Deviation	.776	.859	1.177	.851

Information in Table 1 shows that students taught by teacher T performed better than other classes (M=2.28, STD=0.851) followed by students taught by teacher K (M=2.14, STD 1.177). The mean for classes taught by teacher G and teacher R were below of those taught by teacher K and teacher T. The means for all classes were very low putting to account that the lowest score a student could score was 1 out of a scale of 12. Students' entry behaviour as measured by their KCPE results was 57% which correspond to 6 point in a scale of 12. The findings are consistent with that of Bonney *et al* (2015) study that investigated the relationship between the quality teachers and students' academic performance in Sekondi Takoradi Metropolitan Assembly (STMA) Junior High Schools, Ghana. The results of the study show that even though the quality of teachers was high in terms of their academic and professional qualifications, it did not reflect much in the performance of the students. Wenglinsky (2002) reported that the amount of time spent in professional development is not significantly related to student achievement; however, professional learning in higher-

order thinking skills, special populations, and hands-on learning are positively related to student achievement.

Hirsh and Killion (2009) provided principles to consider for sustained professional development. The principles are strong, underlying beliefs that drive our actions. The principles are based on four assumptions: (1) context matters for sustainability; (2) capacity of the people involved matters; (3) learning informs actions directly related to student learning; and (4) not all content is the perfect solution for the specific challenge. According to Martin (2007) there are five standards identified by the National Council of Teachers of Mathematics as extracted from Texas Education Code: (1) knowing mathematics content; (2) knowing school mathematics; (3) knowing students as learners of mathematics; (4) knowing mathematics pedagogy; and (5) developing as a teacher of mathematics. The emphasis is placed on the teachers' reflective practice and their effect on student learning. During SMASE training, teacher subject content has been ignored. None of the teachers involved in the present study had postgraduate certificate in subject area in Biology. According to Hill (2007) the effect of teacher characteristics on high school students' mathematics achievement that had a master's degree in mathematics significantly predicts student gains and this can be applicable to biology in the present study. The data in Table 1 was subjected to ANOVA test to find out if the means were significantly different and the results are summarised in Table 2.

Table 2. ANOVA test for significant relationships among the means

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	8.039[a]	3	2.680	3.210	.026
Intercept	522.085	1	522.085	625.357	.000
TEACHER	8.039	3	2.680	3.210	.026
Error	93.504	112	.835		
Total	619.000	116			
Corrected Total	101.543	113			

a. R Squared = .079 (Adjusted R Squared = .055)

Table 2 shows the results based on ANOVA test between teachers' professional development and students' academic performance. The results suggest that teachers' level of professional development is significantly associated with students' academic performance, $F\ (3, 112) = 3.210$, $p < .05$. The null hypothesis that stated that there is no significant difference between teachers' level of professional development and students' academic performance was rejected. Tukey's Post-hoc test was done to establish where significant mean differences existed among the means of students' academic performance. Table 3 presents the summary of the findings.

Table 3. Post-hoc Tukey's HSD test

(I) TEACHER	(J) TEACHER	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
R	G	.246	.225	.276	-.200	.692
	K	-.084	.233	.719	-.546	.378
	T	-.532*	.250	.036	-1.027	-.037
G	R	-.246	.225	.276	-.692	.200
	K	-.330	.236	.165	-.799	.138
	T	-.778*	.253	.003	-1.280	-.277
K	R	.084	.233	.719	-.378	.546
	G	.330	.236	.165	-.138	.799
	T	-.448	.260	.088	-.964	.068
T	R	.532*	.250	.036	.037	1.027
	G	.778*	.253	.003	.277	1.280
	K	.448	.260	.088	-.068	.964

Post-hoc Tukey's HSD test in Table 3 shows that means for classes taught by teacher T and K were significantly different ($p = .003$ and $p = .036$ respectively) from other means. The means for classes taught by teacher T and K were not significantly different $\alpha = .05$. The finding is consistent with that of other researchers. According to Kwang *et al* (2008) providing professional development to teachers has a moderate effect on student achievement across the nine studies they reviewed. The researchers observed that average control group students increased their achievement by 21 percentile points if their teacher had received professional development.

Jepketer *et al* (2015) investigated how the teachers' capacity building strategies influence students' performance in public secondary schools in Nandi County. Their finding shows that teacher capacity development influences students' performance to a greater extent. Jepketer *et al* concluded that continuous in-service education and training and for which teachers employ at a given time leads to improved students' performance.

Similarly, teachers' capacity development should be strengthened in order to enhance teacher professional growth, and to realize quality students' outcome in academic achievement. According to Gene (2000) policies adopted by states regarding teacher education, licensing, hiring, and professional development may make an important difference in the qualifications and capacities that teachers bring to their work.

Table 3 also shows that the mean for teacher G and R were also not significantly different at $\alpha = 0.05$. The findings are consistent with those of other researchers. According to Bonney *et al.* (2015) study findings carried out in Ghana, pupils' academic performance and their teachers' teachers' pedagogical skills and pupils' academic performance was not significant. Their finding implied that the performance of the pupils in the 2011 and 2012 examination had nothing to do with the pedagogical skills of the teachers.

Consequently, the pupils' performance in 2011 and 2012 could not be attributed to the pedagogical skills of the teachers. SMASE mostly train teachers on teaching skills and emphasis on ICT in content deliver. According to Kwang *et al* (2008) professional development activities that provide teachers with pedagogical content knowledge are more effective than those based on content-free pedagogical practice. Desimone (2010) reports that focus for professional development in math and science should be on math and science content and how students learn the content. Thus, for math and science, professional development should focus on subject-matter content.

CONCLUSION AND RECOMMENDATION

The finding of the study shows that there is a statistically significant difference between students' academic performance between classes taught by teachers with high teacher professional development compared to those taught by teachers with lower professional development. Students taught by teachers with higher level of professional development performed better than those students taught by teachers with lower professional development. It was recommended that the school in conjunction with TSC and MOES&T plan in-service courses in teachers' capacity building in order to improve students' academic performance.

It was also found out that the means for the classes taught by teachers with low professional development was not significant. It was recommended that the concerned teachers be trained more in content knowledge which the other two teachers with higher professional development may have acquired during training as KNEC examiners. The study also revealed that despite the school having some highly qualified teachers, students' academic performance was very poor and there is need for further research to establish the reason for the low students' academic performance.

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