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Influence of teacher characteristics on students' academic achievement among secondary schools

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ABSTRACT
The purpose of this study was to establish the relationship between teacher characteristics and students' academic achievement. The study was guided by Education Production Function theory (EPF) which connects student academic achievement to teacher characteristics. The study was conducted in Nandi District, Kenya and the target population comprised of teachers of all 26 public secondary schools. The study applied a causal comparative research design. A questionnaire was used for data collection. Data was analyzed using descriptive and inferential statistical techniques. The study findings suggest that there was no significant relationship between teacher qualification and student academic achievement.
Key words: Teacher characteristics, academic achievement, experience and qualification

INTRODUCTION

Education is widely regarded as a basic human right, a key to enlightenment, and a source of wealth and power (Mugenda & Mugenda, 1999). Education is critical to industrial and technological development, with the history of developed nations bearing records of this, developing nations aspiring to realize the same status have to put a premium. UNESCO (1986) indicates that knowledge holds key to the attainment of the millennium development goals, which include, food security, eradication of child mortality, and reduction of the spread of HIV and AIDS among others. Ali (2009) observes that there was statistically significant relationship between teacher characteristics and student academic achievement. Adeyemo (2005) notes teacher characteristics influenced teaching and learning in classrooms. Olaleye (2011) establishes that there was relationship between teachers characteristics and pupils performance. Gravestock & Gregor-Greenleaf (2008) states that the explanations for good or poor student's academic performance have been quite exhaustive yet controversy still exists among scholars as to what contribute singly or jointly to students' poor performance. The teacher characteristics found to be dominant in cross-country studies are related to; qualification, experience, attitude and personality.

Akinsolu (2010) asserts that availability of qualified teachers determined the performance of students in schools. Coonen (1987) emphasizes that teachers involved in in-service training were more effective in classrooms as compared to teachers who had not undergone training. Wirth & Perkins (2013) indicate that teacher's attitude contributed significantly to student attention in classrooms whereas Adesoji & Olatunbosun (2008) illustrates that student attitude was related to teacher characteristics. This therefore meant that teacher's attitude directly affected students' attitude. On teacher personality, Adu & Olatundun (2007) contend that teachers' characteristics are strong determinants of students' performance in secondary schools.

Scholars and researchers generally are in agreement that the school variables, which include teacher administration, perform a critical role in educational achievement than other variables (Patrick, 2005). The important role of the teachers in the learning is unquestionable. Teachers have a lot of influence on their classroom practices. Teachers should have and apply specific abilities without which their influence may not be reflected in their students' performance in the subject. For students to be able to make connection between what is taught in school and its application in problem solving in real life, the teacher has to be effective in their teaching. There has been no consensus on the importance of specific teacher factors, leading to the common conclusion that the existing empirical evidence does not find a strong role for teachers in the determination of academic achievement. This study therefore sought to investigate the influence of teacher characteristics in influencing students' performance.

LITERATURE REVIEW

Concept of Teacher Characteristics

The term "teacher characteristics" can be referred to as qualities that can be measured with tests or derived from their academic or professional records. They indicate that teacher characteristics does not generally refer to the direct observation of their influence on students' learning in terms of either students' test performance or teaching behaviors. Rather, the approaches dealt within the scope of this research are those that fall traditionally into the province of personnel psychology or personnel selection. This review deals with those characteristics of teachers that might be identified and used in the initial hiring of teachers to increase their students' achievement. Ashton (1996) indicates that these characteristics could include qualities of teachers that are viewed as personal – such as mental ability, age, gender – or as "experiential" – such as certification status, educational background, previous teaching experience and the like. Some characteristics are combinations – in unknown amounts – of personal and experiential qualities, for example; candidates' performance on teacher-certification tests such as the national teacher examinations and state-mandated tests.

Teacher Qualification and Student Academic Achievement

Darling – Hammond (1998) defines well qualified teacher as one who was fully certified and held the equivalent of a major in the field being taught. Although the formal qualification of teachers is an important indicator for their knowledge and competence in teaching, it has only limited utility in analyzing how well prepared teachers are for what they have to teach in schools. More detailed knowledge of the courses they have taken during their training needs to be compared to the actual content and skills required to teach the high school's curriculum. Ruthland & Bremer (2002) refer to teacher qualification in two ways - traditional and alternative qualification routes. Traditional certification is when an individual completes an undergraduate degree or post graduate program in education. Alternative routes of certification are based on coursework in pedagogy and subject area without a degree in education. Hardy & Smith (2006) cite short term activities such as mentoring, peer evaluations and workshops as ways other than formal qualifications for improving teaching. More often graduates teachers with first degree content go into teaching if they cannot find another job right away. Although they often get somewhat lower salary than a fully qualified teacher; they choose not to enroll in the one year post- graduate professional training and therefore lack a basic foundation for teaching.

Huang & Moon (2009) documents that teacher qualification accounted for approximately 40 to 60 percent of the variance in average of students' achievement in assessment. Richardson (2008) reveals that students in urban areas performed better than those in rural areas. The researcher suggests that the availability of enough qualified teachers must have been a determinant for students' performance. However, in Kenya, some schools in the rural areas have performed better than their urban counterparts (Owoeye & Yara, 2011). Maundu (1986) concludes that there was significant correlation between teacher qualification and pupil performance in Kenya. The good performance was attributed to excellent instructions given by qualified teachers in addition to other inputs. Maundu (1986) establishes that teachers who had graduated from Kenya Science Teachers College were more practically oriented than those who had degrees from public universities.

Wilson et al. (2001) suggest that even with the shortcomings of current teacher education and licensing, fully prepared and certified teaches are more successful with students than teachers without this preparation. Ashton (1996) notes that teachers with regular state certification receive higher supervisor ratings and student achievement than teachers who do not meet standards, but this observation was based on data with virtually no statistical controls having been imposed. In spite of the quantity of research on the benefits of teacher certification for student learning, little of the past research exercised controls over student "inputs" that would

give the critical reader confidence in the findings. Laczko & Berliner (2001) assert that the impact of certification status on student achievement in two large urban school districts in the United States of America. These school districts provided information about teachers hired for the 1998-1999 and 1999-2000 school years. Information included the school where they were currently teaching, the grade level taught, the teacher's certification status, highest degree earned, date and institution where it was achieved, age, and number of years teaching experience.

It has been evidenced that in many countries, teacher qualifications that are considered to be related to student learning have become desirable targets of teacher education reform. Some of these reforms call for the professionalization of teacher education by making it longer, upgrading it to graduate programs, and regulating it through mechanisms of licensure, certification, and promotion aligned with standards (Darling-Hammond et al.,

2001; 2002). Findings related to teachers' academic degrees (for example; bachelors or masters among others) are inconclusive. Some studies suggest positive effects of advanced degrees (Rice, 2003; Wayne & Youngs, 2003). Some argue that the requirement of a second degree raises the cost in terms of teacher education and the time it involves and may prevent quality candidates from choosing this profession (Murnane, 1996). This characteristic is related to the subject-matter knowledge teachers acquire during their formal studies and pre-service teacher education courses. The evidence gained from different studies is contradictory. Several studies report a positive relationship between teachers' preparation in the subject matter they later teach and student achievement (Goldhaber & Brewer, 2000), while others have less unequivocal results. Monk & King (1994) find both positive and negative effects of teachers' in-field preparation on student achievement. Goldhaber & Brewer (2000) find a positive relationship in mathematics, but none in science. In addition, Rowan et al., (1997) report a positive relationship between student achievement and teachers' majoring in mathematics. Monk (1994) observes that having a major in mathematics has no effect and a significant negative effect of teachers with more coursework in physical science.

Teacher Experience and Student Academic Achievement

Teacher experience has a significant effect on pupil performance in primary schools and at upper secondary level. Experienced teachers have a richer background of experience to draw from and can contribute insight and ideas to the course of teaching and learning, are open to correction and are less dictatorial in classroom. Teachers' experience and student achievement was that students taught by more experienced teachers achieve at a higher level, because their teachers have mastered the content and acquired classroom management skills to deal with different types of classroom problems (Gibbons et al., 1997). Furthermore, more experienced teachers are considered to be more able to concentrate on the most appropriate way to teach particular topics to students who differ in their abilities, prior knowledge and backgrounds (Stringfield & Teddlie, 1991).

Teachers attendance of in – service training are one of the indicators of experience. Teachers' motives to attend in-service training can be manifold e.g. increase in salary, career planning, keeping up with developments, filling in lacunae, removing insecurity and meeting colleagues. In the Science Education Project in South Africa (SEP), the objectives were mainly formulated by the developers after having consulted various experts who had experience with Education in Africa. The teachers in this program had been and did not have any experience with practical work. Only in a later stage of their in-service training course they had a better idea of the possible content and methods, did formulating objectives of their own lessons become part of the program (Fullan, 1992). Therefore, the more the teachers know about students, the better the teachers can connect with them and the more likely they will be able to benefit from the teachers' experience in reconstructing their world. The knowledge that teachers need about students in order to connect with them is gained through interaction. For many reasons, measuring the real impact of experience on a teacher's effectiveness is complex, more so than measuring any other teacher attribute. Consequently, many well-constructed research attempts to interpret the relationship between experience and effectiveness have produced varying results that reveal no particular pattern. Murnane (1996) found that teacher effectiveness improves rapidly over the first three years of teaching and reaches its highest point between the third and fifth year but found no substantial improvement after year five.

In contrast, a small number of studies suggest that teacher experience effects may be evident for a longer period of time. Murnane & Phillips (1981) state that experience had a significant positive effect on elementary student achievement among teachers during their first seven years of teaching. Ferguson (1991) reveals that at the high school level, students taught by teachers with more than nine years of experience had significantly higher test scores than students whose teachers had five to nine years of experience. Rivers & Sanders (2002) suggest that teacher' effectiveness increases dramatically each year during the first ten years of teaching". In the extreme case, Clotfelter et al., (2007) found evidence of growing teacher effectiveness out to 20 or more years in their analyses of North Carolina teacher data, although more than half of the gains in teacher effectiveness occurred during the first few years of teaching. Stronge et al. (2007) assert a positive relationship between teachers' verbal ability and composite student achievement, verbal ability has been considered an indicator of teacher quality. The basic logic is that teachers rely on talk to teach (explaining, questioning, and providing directions). What verbal ability means and how to measure it, it turns out, are not straightforward. Lai (2011) measured teachers' verbal ability with a 30-item sentence completion test. Thus, though talk about the importance of teachers' verbal ability persists, it is not a strong measure of teacher quality.

METHODOLOGY

The teacher characteristics investigated were; qualifications and experience. The study was conducted in Nandi South District, Kenya in the year 2012. The study adopted a causal – comparative research design. Role (2010) suggests that the cause – effect linkage is made logically as the research process proceeds. Therefore, in this study teacher characteristics could be a factor influencing student academic achievement. The study sampled 20 secondary schools in the district from a total population of 26. The respondents were teachers from 20 secondary schools within the district. Simple random sampling was used to select one teacher in each school. A questionnaire was used as instrument for data collection and data collected was analysed using both descriptive and inferential statistics.

RESULTS

Relationship between teacher qualifications and students' academic achievement

The first objective of this study was to determine the relationship between teacher qualification and student academic achievement. To achieve this objective, a cross tabulation was carried out between teacher qualification indicators (degree, diploma, and A – Level) on rows against student academic achievement average (for 2007, 2008 and 2009) on the column side.

Table 1: Relationship between teachers qualification and students' academic achievement

			Student academic achievement			
			High	**Average**	**Below**	**Total**
Teachers qualification	Degree	Count	4	3	6	13
		%	30.8%	23.1%	46.2%	100.0%
	Diploma	Count	1	3	1	5
		%	20.0%	60.0%	20.0%	100.0%
	Untrained	Count	0	0	2	2
		%	.0%	.0%	100.0%	100.0%
Total		**Count**	**5**	**6**	**9**	**20**
		%	**25.0%**	**30.0%**	**45.0%**	**100.0%**

(Source: Research Data 2010)

The results on the contingency reveal that as the level of education increases, the student performance in increased. The result implies that teacher academic qualification influence student's academic achievement.

$H0_1$: There is no significant relationship between teacher academic qualification achievements with students' academic achievement

Table 2: Teacher qualification and performance chi-square tests

	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	5.074[a]	4	.280
Likelihood Ratio	5.676	4	.225
N of Valid Cases	20		

a. 8 cells (88.9%) have expected count less than 5. The minimum expected count is .50.
(Source: Research Data 2010)

The results suggest that; at χ^2 (4, N=20) = 5.07, p= 0.28) teacher qualification and student academic achievement is not statistically significant. We therefore accept the null hypothesis. The results illustrate that teacher qualification does not influence student's academic achievement.

Relationship between teachers experience and students' academic achievement

The second objective of the study was to investigate the relationship between Biology teachers' experience (years of teaching, attendance of in-service courses and setting and marking of national examinations) and students' academic performance in Biology. Experience is highly valued in the teaching profession, more so than in many other professions. With experience playing such a major role in secondary schools complex cost-benefit considerations, it makes sense to consider how teacher experience influences student achievement.

Table 3: Relationship between teaching experience and student academic achievement

			Student academic achievement			
			Low	**Average**	**High**	**Total**
Biology teaching experience	12 years and above	Count	0	0	3	3
		%	.0%	.0%	100.0%	100.0%
	9-11 years	Count	2	3	0	5
		%	40.0%	60.0%	.0%	100.0%
	5-8 years	Count	1	1	1	3
		%	33.3%	33.3%	33.3%	100.0%
	3-5 years	Count	1	1	1	3
		%	33.3%	33.3%	33.3%	100.0%
	Under 3 years	Count	5	1	0	6
		%	83.3%	16.7%	.0%	100.0%
Total		**Count**	**9**	**6**	**5**	**20**
		%	**45.0%**	**30.0%**	**25.0%**	**100.0%**

(Source: Research Data 2010)

From the Table 3, it is clear that as the number of years of teaching progresses, students' academic achievement increases. This is evident with the fact that teachers having less than 3 years of experience, students' academic achievement is below average (83.3%) as compared to teachers who have 12 years and above teaching experience whose students' academic achievement is high (100%). Therefore, it can be concluded that as the number of teachers' years of experience progresses, student academic achievement increases and vice versa.

$H0_2$: There is no significant relationship between teacher experience and student academic achievement

To test the significance of these results, a chi square analysis was carried out and the probability error was set at 0.05 levels.

Table 4: Teaching experience and student academic achievement Chi-square tests

	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	15.963[a]	8	.043
Likelihood Ratio	17.364	8	.027
N of Valid Cases	20		

a. 15 cells (100.0%) have expected count less than 5. The minimum expected count is .75.

(Source: Research Data 2010)

The results report that; at ($\chi^2(8, N=20) = 15.963$, $p= 0.043$), the null hypothesis is rejected and it is concluded that there is statistically significant relationship between the number of years teachers have been teaching the subject and student academic achievement.

CONCLUSION

This study investigated the influence of teacher characteristics and students' academic achievement in secondary schools. The findings reveal that student academic achievement (in 2007, 2008 and 2009) was below average for 45% of the schools, 6(30%) achievement was on average while 5(25%) of schools had high student academic achievement. The poor performance was attributed to inadequate number of teachers in most secondary schools within the District. On teacher qualification, the study established that 65% of teachers were degree holders, 25% had diploma certificates while only 10% were untrained. Cross tabulation results suggest that there was no difference in performance between teachers who had degrees or diploma suggesting that teacher qualification did not result to increased student academic achievement. The chi square result illustrate that there is no significant result between teacher qualification and student academic achievement. Participation of teachers in professional development programmes has benefited a lot with improvisation of teaching methods. Teachers with 3 years and above of teaching, recorded higher student academic achievement. This led to rejection of null hypothesis that there was no significant relationship between teacher experience and student academic achievement.

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