

The Contribution of Teachers' Qualifications on Achievement in Mathematics in Kenya

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Abstract

Performance in mathematics in comparison to other subjects has remained a challenge to many pupils at primary and secondary schools alike. This study was intended to determine the extent to which teachers' qualifications influence achievement in mathematics by class 8 pupils in public primary school in Vihiga sub-county, Western Kenya. The study was conducted through causal –comparative research design. All mathematics teachers of class 8 and all their pupils formed the target population. The study employed multistage sampling techniques. A total of 30 mathematics teachers from 30 sampled schools out of 153 public primary schools in Vihiga as well as class 8 pupils in the 30 sampled schools constituted the sample. Data was collected from the selected mathematics teachers through a questionnaire generated by researcher and administered in person. The data on achievement was translated to frequency counts and the chi square statistic used to establish the association between teachers' qualifications and pupils' achievement in mathematics at significance level of 0.05. It was established that at significance level of 0.05, there was significant relationship between teachers' academic and professional qualification with achievement in mathematics. From the findings of the study, it was recommended that more qualified teachers of mathematics be deployed in upper primary in order to improve examination results

Keywords: teachers' qualifications, primary school, pupils' achievement in mathematics

1. Introduction

Highly qualified mathematics instructors are aware of the instructional strategies and assessment practices that best meet the academic needs of diverse students' population with a variety of learning styles (Darling-Hammond, 2000). The National Committee on Education Objectives and Policies (ROK,2001) stated that, the quantitative attributes of the teacher are of paramount importance in determining the quality of education in which intellectual development of the child is based while (Kadiri,2004) attributed quality of education in Kenyan schools to education background and training of the teacher. The quality of the teacher determines the success of any educational system and the level of educational performance as well as achievement in examination. According to the ministry of education, science and technology report of the third teacher education conference held in Njoro, Kenya (ROK,2001), the teachers' performance heavily depends on a number of factors such as attitude, professional and academic background. The education infrastructure of the institution and staff development programs that are in place at a given time also contribute a lot to teacher performance (ROK, 2001). According to UNESCO, the role of the teacher is the most important single factor for the delivery of the curriculum. The Ministry of Education Strategic Plan (MOE,2007) , explains the role of the teacher as key in ensuring that effective teaching and learning process takes place within the learning institutions.

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Although there are many variables that affect performance, it was observed that pupils under the tutelage of teachers with a better understanding of mathematics were able to perform much better in mathematics than pupils being taught by teachers with lower competence levels in mathematics. A study that was conducted by African Population and Health Research Centre (APHRC) pointed out that teachers who were supposed to impart knowledge to the students could be the source of poor performance in mathematics. The organization tested mathematics skills in a study covering 72 primary schools, 2,437 pupils and 211 teachers. The results indicated that the average score was 60% for teachers and 46% for pupils, with some teachers scoring as low as 17% this means, no teacher in the sample had a complete mastery of the subject (APHRC, 2010). Therefore, the teacher subject knowledge gap among teachers of mathematics in Kenya is a huge enough problem to warrant special attention.

Research Objective

The objective of this study was to:-

Establish the effect of teachers' academic qualifications on pupil achievement in mathematics in public primary schools in Vihiga.

Research Hypothesis

The study was guided by the following research hypothesis:

H₀: There is no statistical significant relationship between teachers' academic qualifications and pupils' mathematics achievement in primary schools in Vihiga.

H_A: There is a statistical significant relationship between teachers' academic qualifications and pupils' mathematics achievement in primary schools in Vihiga.

2. Methodology and Research Design

The study employed causal-comparative research design in which from a total of 153 primary school teachers in Vihiga sub-county of Kenya, a total of 46 teachers comprising of 24 P1 (Primary 1) teachers, 18 ATS (Approved Teacher Status) teachers and 4 graduate teachers who taught class 8 mathematics in public primary schools were randomly selected to take part in the study. A questionnaire for the mathematics teachers was developed and first presented to mathematics educators who read through, advised on where corrections were to be effected and then endorsed for use. Their views together with the results of piloting in 2 primary schools in the neighboring district were used in revising the instrument. The instrument yielded similar data from similar respondents over time with reliability coefficient of 1.0. The rule of thumb is that alpha values of at least 0.7 are considered optimal (Kulter, 2007). The researcher visited the 46 sampled schools and administered the questionnaire to the respondents in person. The data collected on pupils' achievement was summarized into frequency counts in three broad categories: top performance (Grade A to B); average performance (Grade B- to C-) and weak performance (Grade D+ to E). A contingency table for teachers' academic qualifications and pupils' achievement in mathematics was drawn and chi square value computed. Calculated chi square value was compared with critical chi square table value at 0.05 alpha level to establish if there was a statistical significant relationship between teachers' teaching experience and pupils' achievement in mathematics.

3. Results and Discussion

From table 1, holders of a bachelor's degree in education had relatively higher proportions of pupils in the average and top performance brackets. P1 and Diploma/ATS teachers had more proportions of their learners in the weak performance bracket (57.12% and 47.46% respectively). To establish whether there was a statistical significant relationship between teachers academic qualifications and pupils achievement, a chi square test was conducted at significance level (α) 0.05 and degrees of freedom (df) 4.

Table 1: Teachers’ Academic / Professional Qualification and Pupils’ Mathematics Achievement

Achievement Qualification	Top performance	Average performance	Weak performance	Total
PI	35(5.86%)	221(37.02%)	341(57.12%)	597
ATS /DIP	24(5.81%)	193(46.73%)	196(47.46%)	413
BED	11(18.65%)	31(52.54%)	17(28.81%)	59
TOTAL	70	445	554	1069

χ^2 Critical ($\alpha = 0.05$, $df = 4$) is 9.488, which is lower than χ^2 observed ($\alpha = 0.05$, $df = 4$) that was 35.243. The null hypothesis was rejected and alternative hypothesis adapted, therefore more qualified teachers of mathematics were contributors to pupils’ achievement than the less qualified ones. The fact that B.Ed teachers had the largest influence on achievement in mathematics appears to suggest a cohort with superior training and more dedication to work. The results are in concordance with Darling – Hammond (2009) and Fuller & Alexander (2004) all who asserted that there is a positive association between training variables and achievement.

4. Research Conclusion

Based on the results of this research, it could be concluded that graduate teachers are more effective in contributing to better performance of pupils in primary mathematics than other categories of teachers.

5. Research Recommendations

In light of the findings and conclusion of the present study, the following recommendations are made:

- More qualified should be deployed to teach mathematics in upper primary in a bid to improve examination results.
- Teachers should be sensitized on the need to enroll for further studies to enhance on their effectiveness and pupils achievement in mathematics.

References

APHRC (2010). Improving Mathematics Performance in Kenya. How Better Teacher Subject Knowledge Contributes to Academic Attainment. No 18

Chacko, I. (1981). Learning Outcomes in Secondary Schools Mathematics as Related to Teacher and Student Characteristics. Unpublished Ph.D Thesis, University of Ibadan,Ibadan.

Darling-Hammond,L.(2009). Teacher Quality and Student Achievement: A review of State Policy Evidence. Settle: Centre for the study of Teaching and Policy.234-300

Darling-Hammond, L. (2000). Solving the Dilemmas of Teacher Supply, Demand, and Standards: How Can We Ensure a Competent, Caring, and Qualified Teacher for Every Child. National Commission on Teaching in America’s Future. New York: DeWitt Wallace-Reader’s Digest Fund.

Fuller, E.J& Alexander,C.(2004). Does Teacher Certification Matter? Teacher Certification and Middle School Mathematics Achievement in Texas. Paper presented at the National Meeting of the American Education Research Association, San Diego

Kadiri. S. A. (2004). The Effectiveness of the Personalized System of Instruction among Secondary School Students in Osun State. Unpublished Phd Thesis, Obafemi Awolowo University, Ile-Life, Nigeria.15 - 18.

Kulter,S.(2007) Quantitative Social Research Methods.Sage Publication.Los Angeles

- Ministry of Education, (2007). Ministry of Education strategic plan 2006-2007. Nairobi. Government printer.
- Howard, T. (2003). Who Receives the Short End of the Shortage? Implications of the U.S. Teacher Shortage on Urban Schools. *Journal of Curriculum and Supervision*, 18(2), 142-160.
- Republic of Kenya (2001). Economic survey. Government printer. Nairobi