The effect of teachers’ qualifications on students’ performance in mathematics

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Accepted 9 January, 2014

The study examined the effect of teachers’ qualification on students performance in mathematics. Three hundred students were randomly selected from ten schools that were purposively selected from sixteen secondary schools in Ikere Local Government Area of Ekiti State and used as sampled for the study. The qualification of the teachers was used as the criteria for selection of mathematics teachers. The three hypotheses in the study were tested using t-test statistic. The results showed that a significant difference existed in the performances of students taught by professional teachers and non professional teachers, between students taught by NCE teachers and B.Sc Ed. Teachers and also between B.Sc teachers and B.Sc Ed. teachers at $P < 0.05$. The study recommended that, only qualified mathematics teachers should be allowed to teach mathematics at the secondary school level. While the holders of Nigeria Certificate in Education (NCE) should be allowed to proceed in their education either through part-time or study leave likewise teachers without teaching qualification should be advice to pursue their Post Graduate Diploma in Education (PGDE). This may improve their teaching method in order to improve the performance of students in mathematics.

Key words: Effect, teachers’ qualifications and students’ performance.

INTRODUCTION

The quality of education of a nation could be determined by the quality of her teachers. The most important factor in improving students’ achievement in mathematics is by employing seasoned qualified teachers in all schools (Abe and Adu, 2013). Okuruwa (1999) found that, policy investment on quality of teachers is related to improvement in students’ performance. Specifically, the measurement of teacher’s preparation and certification are correlates of students’ achievement in science and mathematics. It is further reported that, teacher’s characteristics such as certification status and degree in area of specialization are very significant and positively correlated with students learning outcomes in science and mathematics. This report was in line with the findings of Salman (2009).

Abe and Adu (2013) and Wiki (2013) opined that, a teaching qualification or teacher qualification is one of a number of academic and professional degree that enables a person to become a registered teacher in primary or secondary school. Such qualifications include, but are not limited to, the Postgraduate Certificate in Education (PGDE). The Professional Diploma in Education (PDE), Bachelor of Education (B.Ed) and Nigeria Certificate in Education (NCE). In Ekiti State, teachers who are academically qualified and those that are professionally qualified are engaged to carry out instructional process (Ahiazu and Prince Will, 2011).

Academically qualified teachers refer to those who have academic training as a result of enrolment into educational institution and obtained qualifications such as HND, B.Sc, B.A, and M.A. and so on; while professionally qualified teachers are those who got professional training that gave them professional knowledge, skills, techniques, aptitudes as different from the general education (Edu and Kalu, 2012). They hold degrees like, B.Ed., B.Sc. Ed, B.A. Ed, and M.Ed and so on. On the other hand, there are studies that have found no significant relationship between teacher educational
qualification and students’ academic achievement. For instance, Igwe (1990) investigated the influence of teacher’s qualification on academic performance of students in science subjects in Kano State. The researcher found no significant relationship between teacher’s qualification and students’ performance. While Adeniji (1999), Osokoya (1999) and Oladele (1999) found out that teacher’s qualification contributed minimally to the variance with students’ cognitive achievement and Bilesanmi (1999) and Okonwa (1999) found that teacher’s experience was highly significant on students’ academic achievement in mathematics. Coonery (1990) opined that students do not understand mathematics when it is taught by an ineffective teacher. Izumi and Eves (2002) buttressed this by saying that teacher quality is the most important among other critical factors like quality curricula, funding, small class size and learning situation. George (2004) attributed poor achievement of students in mathematics to teacher qualification, inadequacy of materials as well as administrative factors.

In teaching mathematics, Adesina (1982) and Fafunwa (1985) opined that with an exception of holders of minimum of B.Sc in mathematics, many other teachers would be confronted with problem of teaching secondary school mathematics syllabus effectively. Hence, Lussa (1985) argued that no one gives what he/she does not possess. He further said that no matter how good a course curriculum is, if we do not have well trained, qualified and motivated teachers, we may not achieve the desired goals.

In view of this, a teacher is someone who has been exposed to a good measure of training in a teaching subject area as well as in professional education; such professionally qualified teachers may according to the Federal Ministry of Education (2004) fall into a number of academic categories. Mkpa (1987) regarded the trained teacher as someone who underwent and completed his education in a formal teacher training institution or in a planned programme of training. Among such areas of training may include principles and practice of education as well as being exposed to an observed period of internship either after or as part of the period of training. People who fall within this category should under normal circumstances be able to fulfill the various functions expected of teachers within and outside the four walls of the classroom.

Furrugia (1987) perceived a professional teacher as one who possesses professionally based knowledge in the theory and practice of education as well as find job satisfaction in the belief that he/she is making an important contribution to the social, cultural and economic development of his/her country. Such a teacher should equally, be able to understand students’ abilities to exploit educational benefits of the social context within which he/she lives. He/She should be able to assist students to reach their full intellectual and social potentials.

According to Adieze (1986) non qualified and non-professional teachers in teaching profession are killing the profession because they are not really teachers. He regarded them as “bird” of passage that create unnecessary vacuum whenever they see greener pasture and better prospect in the profession they are originally trained for. The comparison of students’ scores in mathematics achievement test based on teachers’ qualifications becomes necessary in order to know if formal teaching methods has any significant effect/influence on students’ performance in mathematics or not.

**Statement of the problem**

Teaching and learning of mathematics depends to a large extent on teacher’s own knowledge of the content and ability to adequately deliver the instruction to the students. However a lot of variables may inhibit or hinder effective dissemination of knowledge to the understanding of the content by the students, such variables may be lack of qualified teachers, teachers’ qualification, experience, inadequate use of instructional materials among others. While the present study sought to determine the effect of teachers’ qualification on secondary school students’ performance in mathematics.

**Research questions**

The following three research questions were raised to assist the study:

1. Is there any difference between the performance of students taught by the teachers holding Nigeria Certificate in Education (NCE) and Bachelor of Science Education B.Sc Ed in Mathematics?.
2. Is there any difference between the performance of students taught by Bachelor of Science (B.Sc.) and Bachelor of Science Education (B.Sc. Ed.) in Mathematics?
3. Is there any difference between the students performance taught by professional and non professional teachers in mathematics?

**Hypotheses**

Based on the above research questions, the following three hypotheses were formulated and tested at 0.05 level of significance.

1. There is no significant difference in performance of students taught by National Certificate in Education (NCE) and Bachelor of Science Education (B.Sc. Ed.) in Mathematics.
Table 1. Number of public and private secondary school teachers by sex in Ikere Local Government Area.

<table>
<thead>
<tr>
<th>School Teachers</th>
<th>Qualified</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Public Schools</td>
<td>275</td>
</tr>
<tr>
<td>Private Schools</td>
<td>285</td>
</tr>
<tr>
<td>Grand Total</td>
<td>562</td>
</tr>
</tbody>
</table>


(2) There is no significant difference in performance of students taught by Bachelor of Science in Education (B.Sc. Ed.) and Bachelor of Science (B.Sc.) in mathematics.

(3) There is no significant difference in performance of students taught by Professional and non-professional teachers in mathematics.

MATERIALS AND METHODS

The study is descriptive research of survey type which involved strictly on the comparative analysis of students' performance based on teacher's qualifications, whether professional or non-professional. It is a survey type which aimed at collecting data on and describing in a systematic manner, the characteristics, features or facts about a given population (Champion, 1970; Nworgu, 1991, 2006; Gay, 1996; Adeyemi, 2007).

Population

The population for the study consisted of all private and public secondary schools in Ikere Local Government Area of Ekiti State. The number of schools was sixteen all together which involve six private and ten public secondary schools. While the analysis of number of public and private secondary school teachers by sex in Ikere Local Government Area was presented in Table 1, the table shows that the population for the study is definite (known) for both number of Schools and Teachers.

Sample and sampling techniques

A sample of three hundred students was randomly selected from ten secondary schools' junior class three (JSS 3) which was taught by NCE B.Sc Ed. Or B.Ed., B.Sc without PGDE. The ten schools were purposively selected from the sixteen secondary schools.

Instrumentation

The instrument for the study was an objective test made up of 50 items selected from past junior secondary certificate examination (JSCE) questions based on the topics treated with the students in the study. The questions face and content validities was assumed to have been determined by the State Ministry of Education while the Construct Validity and reliability was determined by the researcher using alpha cronbach, the result of the estimate was 0.73 and this index is considered high and significant enough for this kind of study and is corroborate with the Macintosh (1974) and Alonge (1989, 2004) argued that reliability coefficient of any instrument should range between 0.50-0.85 and above.

The administered questions were gathered and marked by the researcher with the aid of research assistances (The category of teacher employed in each school). A pre-test was administered before the selected topics. Such as change of subject of formula, Trigonometrical ratio, Simple elementary probability and Introduction to statistics which lasted for six weeks and post-test was administered at the end of the six weeks. The pre-test and the post-test scripts were collected and marked by the researcher. The scripts of students taught by each category of teacher were later sampled for analysis. 30 scripts were randomly selected making a total of 300 scripts for 300 students selected from ten schools.

Data analysis

The data collected were analyzed using Mean, Standard deviation and t-test statistic with SPSS 2012 version. That is, t-test statistic was used to test the three hypotheses formulated at 0.05 level of significance.

RESULTS AND DISCUSSION

Hypotheses testing

Ho: There is no significant difference between the academic performances of students taught by NCE and B.Sc. Ed teachers in mathematics (Table 2).

The mean performance score of students taught by B.Sc. Ed teachers (12.18) was higher than the performance of students taught by NCE teachers (9.82) with mean difference of (2.36). The t-test analysis carried out showed that $t_{cal}$ (2.45) was greater than $t_{tab}$ (1.98).
Table 2. t-test analysis of students performances based on NCE and B.Sc. Ed Teachers.

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
<th>df</th>
<th>( t_{\text{cal}} )</th>
<th>( t_{\text{tab}} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCE</td>
<td>9.82</td>
<td>5.25</td>
<td>60</td>
<td>118</td>
<td>2.45</td>
<td>1.98</td>
</tr>
<tr>
<td>B.Sc Ed.</td>
<td>12.18</td>
<td>5.31</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Significant at \( P < 0.05 \).

Table 3. t-test analysis showing the performance of students taught by B.Sc. and B.Sc. Ed Teachers.

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
<th>df</th>
<th>( t_{\text{cal}} )</th>
<th>( t_{\text{tab}} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.Sc</td>
<td>9.52</td>
<td>4.20</td>
<td>60</td>
<td>118</td>
<td>3.04</td>
<td>1.98</td>
</tr>
<tr>
<td>B.Sc Ed.</td>
<td>12.18</td>
<td>5.31</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

At \( P < 0.05 \), *Significant.

Table 4. t-test analysis showing academic performance of students taught by professional and non-professional Teachers.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
<th>df</th>
<th>( t_{\text{cal}} )</th>
<th>( t_{\text{tab}} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-professional</td>
<td>6.98</td>
<td>3.39</td>
<td>180</td>
<td>298</td>
<td>7.92</td>
<td>1.98</td>
</tr>
<tr>
<td>Professional</td>
<td>11.00</td>
<td>5.39</td>
<td>180</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

At \( P < 0.05 \), *Significant.

at \( P < 0.05 \), this implies that, the null hypothesis was not upheld indicating that, there was significant difference in the performance of students taught by NCE and B.Sc. Ed teachers in Mathematics among the junior secondary schools in Ikere Local Government Area of Ekiti State, Nigeria.

\( H_{02} \): There is no significant difference in the performances of students taught by Bachelor of Science (B.Sc) and Bachelor of Science in Education (B.Sc. Ed) in mathematics (Table 3).

The mean performance score of students taught by B.Sc Ed teachers (12.18) was higher than the mean performance score of students taught by B.Sc teachers (9.52) with a mean difference of 2.76. The t-test analysis revealed that \( t_{\text{cal}} (3.04) \) was greater than the \( t_{\text{tab}} (1.98) \) at \( P < 0.05 \), which showed that, there was significant difference in the performance of students taught by B.Sc and B.Sc. Ed teachers, hence the null hypothesis was not upheld at \( P < 0.05 \).

\( H_{03} \): There is no significant difference in the performances of students taught by professional and non-professional teachers in mathematics among the junior Secondary schools (Table 4).

The mean performance score of students taught by professional teachers (11.00) was higher than the means performance score of students taught by non-professional teachers (6.98) with a mean difference of (4.02). The t-test analysis revealed that \( t_{\text{cal}} (7.92) \) was greater than the \( t_{\text{tab}} (1.98) \) this implies that there was significant difference between the performance of students taught by professional teachers and non-professional teachers, hence the null hypothesis was not upheld at \( P < 0.05 \) among the junior secondary schools in Ikere Local Government Area of Ekiti State, Nigeria.

Discussion

The study revealed the mean performance score of students taught by NCE teachers, and B.Sc. Ed. Teachers has a variation of mean performance score of (2.36) that of B.Sc teachers and B.Sc. Ed teachers difference of mean performance score of student (2.76) while that of mean performance score difference of students taught by professional and non-professional was 4.02.

By implication, the effect of teachers’ qualification was showed on the students’ performance in mathematics between NCE and B.Sc. Ed. teachers, even though both teachers were professionally trained. This was in line with the findings of Adeniji (1999), Osokoya (1999) and Oladele (1999) found out that, teachers’ qualification contributed to the students’ academic achievement in Mathematics, this was equally corroborated by Adesina (1982) and Fafunwa (1985).

But at variance with the finding of Igwe (1990), the variation in the mean performance of students taught by non-professional land professional teachers was in line with the assertions of Lassa (1985), Adieze (1986), Furrugia (1987) and Izumi and Evers (2002).
Also, the finding revealed that, at $p < 0.05$, significant difference existed between the performance of students taught by NCE teachers and B.Sc. Ed. teachers, this was an attestation to the quality of teachers being argued by Lassa (1985) that no one can give what he/she does not possess and the finding corroborates with the findings of Adeniji (1999) Osokoya (1998), Oladele (1999), Onabanjo (1999), Aina (2002), Wiki (2013) and Abe and Adu (2013). While significant difference existed in performance of students taught by B.Sc holder without teaching qualification and B.Sc. Ed. teachers with teaching qualification, this was in line with the findings of Ahiauzu and Princewell (2011) and Edu and Kalu (2012).

However, the finding revealed significant difference between performance of students taught by professional teachers and non-professional teachers in Mathematics, this also corroborate, the need for non professional teachers to embark on Post Graduate Diploma in Education (PGDE or PDE). The finding was also in line with the findings of Mkpa (1987), Furrugia (1987), Cooney (1990) and Abe and Adu (2013).

Conclusion

The study vividly showed that professional qualification of teachers is the major variables affecting students' performance in mathematics among the junior secondary school in Ikere Local Government Area of Ekiti State, Nigeria.

Recommendations

Based on the findings of this study, the following recommendations were given:

Teachers with NCE should strive to improve their knowledge in Mathematics by acquiring additional qualification through in-service training or part-time or sandwich degree programme in the Universities around their place of working.

Graduate teachers without teaching qualification should endeavour to proceed on PGDE or PDE programme to enhance their teaching method in Mathematics at Junior Secondary Schools level.

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