



ABSTRACT

This research investigates the relationship between mathematics teachers' quality and students' academic achievement in Junior Secondary Schools in Soba Local Government Area, Kaduna State. The sample population comprises of students and teachers from three junior secondary schools in Soba Local Government

A N ASSESSMENT OF THE RELATIONSHIP BETWEEN MATHEMATICS TEACHERS' QUALITY AND STUDENTS' ACADEMIC ACHIEVEMENT: A CASE STUDY OF JUNIOR SECONDARY SCHOOLS, SOBA LOCAL GOVERNMENT AREA, KADUNA STATE.

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INTRODUCTION

The eminent role of teachers in any educational system cannot be underestimated. Teachers are considered the key determinants of student achievement. This is because the standard of education depends largely on the quality of its teacher. This statement coincided with an agreement reached at the 1969 National Curriculum Conference which states that: "teachers are the key tools to the entire educational programmed and observed that the quality of their training makes the end result of the job as a teacher". "The war against poor performance of students in mathematics should be via the war against poor mathematics teaching". Teacher's importance is known but the effectiveness of a teacher depends on the quality of his training. Thus, problem on students' achievement in mathematics should not be with \



the curriculum content but with the quality of mathematics teachers and mathematics teacher's education (Oguntebi 1985).

Teacher's quality therefore is the main concern of policy makers, educational planners, parents, school management, community etc. The rampant poor mathematical achievement in secondary schools is probably as a result of the quality of teaching by mathematics teachers. The study therefore, will attempt to determine measure the relationship between the quality of mathematics teachers and students' achievements. An area of concern to the researcher is the acquisition of the basic mathematical skill, concept, principles and methods by the students, through quality teaching, by qualified mathematics teacher.

Teacher's quality matters; in fact, it is the most important school-related factor influencing student achievement. Moreover, teacher compensation represents a significant public investment. In 2002 alone, the united pay and benefits given \$192 billion in teacher pay and benefits, given the size of this investment, there is remarkable little research to guide such critical decision as whom to hire, retain and promote. In the absence of

Area of Kaduna State. Sample consists of 60 JSS III students and 20 mathematics teachers of the three selected schools from the study area. Questionnaires were administered for teachers and achievement test were shared among the students. The responses from the questionnaires and achievement tests were analyzed using the statistical package (SPSS) and regression analysis in the study. This investigation reveals that the quality of mathematics teachers largely determines on students' mathematical achievement. This investigation recommends an improvement of teachers' quality and student mathematical achievement especially at the junior secondary school level.

Keywords: Assessment, Teacher, Students, Mathematics and Soba Local Government.



strong, robust, and deep body of research, the debate in this field is largely ideological.

This analysis reviews a wide range of empirical studies that examine the impact of teacher characteristics on teacher effectiveness, in order to draw conclusions about the extent to which these characteristics are in fact linked with teachers' performances. Greater clarity on the empirical evidence can inform the wisdom of current practice, guide state efforts as they struggle with no child left behind compliance, regarding teacher's quality and provide direction for future teacher policies decision. For example, developing an approach to policy that values different and multiple teacher characteristics based on the research evidence may prove promising. It is important to note that many important personal characteristics of a good teacher are not measured in the studies reviewed. The focus is on aspects of teacher's background that can be translated into policy recommendations and incorporated into teaching practice. Quality in teaching and learning can be seen in the way the knowledge, skills and ability of the teachers are employed to develop meaningful pedagogic experiences for students. Such experiences are evident when teaching impacts learning and learning influences teaching.

Viewing the above, the researcher had developed interest in investigating the relationship between the quality of mathematics teachers on students' achievements. The research is aimed in understanding if mathematics teachers possess the right mathematical principles, skill, concept, thoughts and methodology. Therefore, the researcher is aim at finding whether students' achievements in mathematics depend legally on teacher's quality or not; hence, the need for technological development. To achieve the stated aim, serious thought should be given on teaching of mathematics; production or training of qualitative teachers and production of students whose mathematical sophistication would probably meets the new space age.

Concept of mathematics

The concept of mathematics was developed in response to need of early societies with growing numbers of people living (Olawola, 1981). The



chambers encyclopedia defines mathematics “as rule of thumb techniques”. It is mentioned that it is the deductive study of number geometry and various abstract constructs. In other words, there is hardly anywhere in any sphere of human existence which does not employ mathematical knowledge in one form or the other. Akin (1985) define mathematics “as a process that involves reasoning and calculation employed in solving daily problems in human life.” It is referred to as the mirror of civilization in all the century of painstaking calculation and the most basic discipline for any person who will be truly educated in any science (Ukeje, 1986). According to Berggren (2012), mathematics is defined as the study of relationship among quantities, magnitudes and properties of logical operations by which unknown quantities, magnitude and properties are reduced.

Teacher’s quality and student’s achievement

Teacher’s quality refers to the strong academic skills, appropriate formal training in the field in which they teach and several years of experience. Most of the research on teacher’s quality published has focused on the link between teacher’s characteristics and student’s achievement. These studies found positive associations between student’s achievement and teacher’s knowledge, measured as their Scholastic Aptitude (or, more recently, Assessment) Test (SAT) or National Teacher Examination (NTE) scores.

Other studies found connections between student’s achievement and teacher’s knowledge proxies such as college major, number of courses, or amount of professional development taken in a subject area (Cohen and Hill, 2000; Darling-Hammond, 2000; Goldhaber and Brewer, 1997, 2000; Monk and king, 1994; Wenghlinisky, 2000, 2002; Wiley and Yoon, 1995). Greenwald, Hedges, and Laine (1996) found, based on a meta-analysis, those teachers who attend better college and/or score higher on standardized tests, produces greater gains in student’s achievement. Teaching experience has been associated with achievement gains in high school mathematics (Fetler, 1999) and elementary mathematics (Murnane and Phillips, 1981; Rowan et-al, 2002).



Studies of relationship between teacher certification and student performance are more mixed (e.g., Darling-Hammond, Berry, and Thorenson, 2001; Goldhaber and Brewer, 2000). For example, Hawk, Coble, and Swanson (1985) found a positive relationship between mathematics achievement and teacher certification in secondary school, whereas Fetler (1999) found a negative correlation between mathematics and emergency credential. Goldhaber and Brewer (2000) found no difference in mathematics achievement according to emergency or regular teacher certificate for high school, and Rowan et al. (2000) found a similar lack of relationship at the elementary school level. These varying findings are likely in part because certification is operationalized quite differently across states.

Qualities of a good Teacher

The qualities of a good teacher have been measured by several scholars in different dimensions and those assessments can be seen as follows:

Teacher Education and Certification: Although teachers' knowledge of a subject matter and pedagogical methods does not guarantee high-quality teaching, this knowledge is necessary and prerequisite. Therefore, teacher's educational attainment and certification status traditionally have been used to gauge teacher's pre-service preparation and qualifications (Nces1999). The conventional route to teaching begins with completion of bachelor's degree. Although this was once considered adequate preparation for teaching, teachers today often are expected to hold advanced degrees. Indeed, many states and district as part of their efforts to raise academic standard, require teachers to attain a master's degree or its equivalent.

Teacher's Preparation and Assignment: A growing body of research suggests that the knowledge of the teacher on a subject-matter is one of the most important elements of the teacher's quality and that of student, particularly in the higher grades and benefit mostly from teachers with strong subject matter background.

Teacher's Experience: Researcher examining the effects of teacher's experience on student learning and found a relationship between teachers' effectiveness and their years of experiences (Murnane and



Philips 1981; and Rowan, Correnti, and Miller 2002). Many studies have established that inexperienced teachers typically are less effective than more senior teachers, but the measurable benefits of experience appear to level after 5 years in service (Rosenholtz and Simpson 1990).

Review of Empirical Studies

Mastery of mathematics content is not the only requirements of qualitative mathematics teacher but also the ability of the teacher to recognize that the evaluation is relevant to classroom situation. As a result of this, mathematics teacher must be prepared to be considerably more than just “other subjects”. The teacher must select appropriate goals for instruction of an individual unit, plan a variety of lessons and units to achieve these goals. The teacher must stimulate the learning of mathematics by developing desirable attitudes and appreciation of mathematics and by teaching the students how to learn mathematics independently. The teacher must guide the students to discover mathematical concept, develop ability to solve mathematical problems, building understanding and accuracy and efficiency in computational skills. The teacher must evaluate the student achievements concepts, skills and problem-solving (Jonson and Rising, 1967). Fakunde (1981) outline that; there is no practical method that leads to good mathematical teaching because situation may vary and therefore; there are certain basic qualities that secondary school mathematics teachers should have. This includes;

- a) The ability of mathematics teacher to think clearly in order to be able to take initiative and be sufficiently resourceful.
- b) The mathematics teacher must have a sound knowledge of the subject mathematics and a clear understanding of its nature and individual difference.
- c) The teacher should see mathematics as a practical game for students and teach the subject as such.

Furthermore, Jonson and Rising outline five (5) qualities of a successful mathematics teachers and these include:

1. Competence in mathematics: a major requirement for a mathematics teacher is a broad mastery of the subject content so



that mathematical structures, elegance and application are known.

2. Skillful in communication: the successful teacher must make mathematical ideas meaningful and comprehensible to his students. Mathematics is not a “spectator sport”. Communication mathematics depends on the active participation of the student.
3. Inspiring values and personality traits: the mechanic of teaching and subject matter competence are not enough for quality teaching of even greater importance is the teacher as a person. The teacher must have a dynamic personality, which encourages students to have positive reactions and attitudes. The teacher must inspire students to accept his guidance and authority. The teacher must enjoy mathematics so that he can teach enthusiastically.
4. Understand and accept students: every teacher should understand the minds and hearts of students. The teacher must realize that his greater task is to keep his student’s thirst for knowledge alive. The teacher must know how to help his student develop positive behaviors in their relation with others. The teachers must understand the culture of his student and accept each of them as a worthy human being. The teacher must listen to them and learn their needs and interest.
5. Competence in personal knowledge: professional judgment must be used in making decision about the content to be taught, the strategies to use, the materials to be involved and evaluations of achievements to be made. Hence, it is important that teacher have an acceptable teaching philosophy, an understanding the curriculum, a background in theories of learning information about materials of instructions, knowledge of educational measurement and a master of many teaching techniques.

Therefore, teacher’s quality can be improved by providing a teacher with assistance of a well-qualified supervisor who can advise the teacher on the classroom methods, in order to ensure quality mathematics teaching, hence, the basis of mathematical achievement.



Discussion of Findings

The study has discovered the reason behind the quality of mathematics teachers on teaching of mathematics especially from the school under the study; there was shortage of qualified teachers both in quality and quantity teaching mathematics in most of government junior secondary schools under study. As it was observed by Lassa(1994), that teacher's quality itself depends on the quality of teacher educators. The richer the teacher educators in their ideas, the more competent they would certainly be in preparing teachers of quantitative education. Eyike (1986) also claimed that the teacher and a good educational institution must have an adequate number of professional trained teachers; it is a known axiom that no educational system can rise above the quality of its teacher.

The study also reveals that the reason behind student performance on mathematical achievement was the teacher's attitude. This was claimed that a good attitude influences student academic performance in mathematical achievements. Based on Greenwald Hedges and Laine (1996), argument on a meta-analysis, that those teachers who attended better college or score higher on standardized test, produces greater gains in student's achievement to learn mathematics and the uses of it required mastery of computation. Hence an achiever is a student who did not only scores above average but also acquires the basic mathematical principle, skills, concepts, and solution methodology.

The study also found out that the teacher's quality affect students' achievement in mathematics, in fact teachers plays an important role in the life of the students. It is worth nothing that researchers working during this period generally assumed that gains in students' achievement were not good indicators of teachers' quality because they represented too narrow a range of outcomes. It was assumed that, in addition to fostering student learning, teachers served as moral role models and that the instilled a variety of social value in their students. Consequently, when researchers tried to evaluate their measures of teachers' personal qualities, they usually looked for evidence of a relationship to observe practices or to principal ratings of teachers; rather an evidence of a relationship to students' achievement (Getzels and Jackson, 1962).

Conclusion

Based on the findings of this study, the researcher however draws the following conclusions that:



1. Student mathematical achievements depend largely on the quality of mathematics teachers in Soba Local Government Area.
2. The achievement of students in mathematics is very poor due to lack of qualified and available mathematics teachers.
3. The quality of mathematics teachers should be the main concerned of educational policy makers, so as to improve the educational standards in most of the schools.
4. Students of secondary school show negative interest or attitude in learning of mathematics.

The findings therefore revealed that if teachers have the competency to teach, then the students' performances will be high. But, when there is a lack of competency, then the student performance will be very low.

Recommendations

The findings of this study as enumerated above have made it necessary to make the following recommendations:

1. Ministry of education can establish teacher-training institution to ensure that student teachers are well trained so as to bring out the best in them when employed.
2. Employers of teachers could employ qualified mathematics teachers so as to improve the quality of Nigeria educational system.
3. Student should be motivated to study mathematics; the students who perform excellently in mathematics will be giving an award.
4. Low achievement students should be trained with extensive extra-moral lessons by specially assigned teacher so as to improve their mathematical achievement.
5. Mathematics instructional materials to be provided by the ministry of education in all the states so as to help in facilitate student's mathematical understanding.
6. Mathematics teachers can employ Poliya's problem solving method to teach some topic in mathematics as it is the most suitable teaching method.
7. Time allocation for mathematics period should be increase.

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