



## Teachers Teaching Qualifications as Predictors of Performance in Trigonometry among Secondary School Students in Kano Metropolis, Nigeria

Muhammad Umar, Sumaila

Kano State College of Education and Preliminary Studies

### ABSTRACT

The study investigated and analysed teachers' teaching qualifications as predictor of performance in trigonometry among secondary school students in Kano State, Nigeria. To guide the study, one research question and one research hypothesis were formulated. The research design for the study was a survey design of ex post facto design. The data was collected from teachers using Teachers Qualification Questionnaire (TCQ), while Trigonometry Students' Performance Test, (TSPT) was used to collect data from students' performance. Descriptive statistics of frequency, percentage, mean and standard deviation were employed to answer the research question. One way analysis of variance (ANOVA) was used in answering the null hypothesis at 0.05 level of significance. Findings from the study revealed that teaching qualifications of teachers did not correlate with the students' academic performances in trigonometry. The study recommended that students' interest in trigonometry need to be boosted to achieve more and that teachers need to obtain relevant pedagogical and content knowledge capable of diversifying their instructional strategies in teaching trigonometry.

### ARTICLE INFO

Article History

Received: October, 2019

Received in revised form: Dec., 2019

Accepted: January, 2019

Published online: March, 2020

### KEYWORDS

Teacher Qualifications, Interest, Academic, Performance, Trigonometry.

### INTRODUCTION

Teacher qualifications are such credentials a teacher possesses before going into the teaching job or obtain them within. Such credentials include among others pedagogical knowledge (teaching skills), content knowledge (knowledge of the subject matter) and teacher certification. Kennedy (2004) defines qualifications as those qualities that teachers have even before they are employed as teachers and that are often assumed to contribute to the quality of their teaching, labeled as teachers personal resources. These include: knowledge, skills and expertise, beliefs, attitudes and values,

credentials and personal traits. In addition, Goe (2007) defines qualifications as resources which teachers bring with them to the classroom and which are considered important in establishing who should be allowed to teach.

From the empirical evidences, Goldhaber and Brewer (2002) noted that students do better in mathematics if taught by a teacher with a bachelors or master's degree in mathematics, hence the level of educational attainment of teachers' qualifications is positively related with students' outcome. But, Klicka, (2007) explained that extensive research has established that no significant correlation



exists between certification (teacher qualifications) and student learning, and kgthat student testing is a far superior method of determining teacher effectiveness. Akinsolu, (2010) states that there is a positive correlation between teacher's qualification and students' academic performance.

Students' academic performance can be defined as the level of accomplishment of school educational goals by students over a stipulated time. Adediwura & Taiwo (2007) defined academic performance as the display of knowledge attained or skills developed in school subjects designated by test and examination scores or marks assigned by the subject teachers. To this effect, the study will investigate teaching style and teacher characteristics as determinants of student's performance in trigonometry in Municipal Education zone, Kano State.

Trigonometry is an aspect of mathematics that deals with the study of the relationship between the sides and angles of a right angled triangle. A right angled triangle is a triangle that has one of its angles equals to ninety degrees. The sides of the right angled-triangle are called adjacent (the side to the base of the right angle), opposite (the side opposite the angle in question) and the longest side opposite the right angle is the hypotenuse. Trigonometry is an area of mathematics that students believe to be particularly difficult and abstract compared with the other aspects of mathematics. Orhun (2002) stated that trigonometry is inseparable part of Mathematics in high school as it takes some topics from arithmetic and geometry as sources yet students did not develop the concepts of trigonometry certainly and that they made some mistakes. Delice (2002) identified that students partially answered questions on trigonometry at the first and second levels

and inadequately answered the questions at the other levels; the students have misconceptions and learning complexities, which is attributed to the fact that before learning the trigonometry concepts, the students learn some concepts, pre-learning concepts, incorrectly or defectively. These concepts are fundamental for learning the concepts of the trigonometry such as unit circle, factorization, and so on. Durmus (2004) indicated that students are not motivated to do trigonometry whereas Akkoc (2008) state that students have difficulty in understanding trigonometry.

Teaching of trigonometry requires sequential approach as sequencing of learning tasks provides linkage between what has been learnt and what is to be learned. For the students to be able to acquire these abilities and skills there is a need for an organized and interactive classroom session and a qualified teacher to take them through. Trigonometry lessons require the use of tools and techniques (a technique is a mode of solving a task and involves a variety of package of reasoning and routine work) for the activities to be undertaken successfully as trigonometry deals with real life situations. If association with real life situations and the importance of learning and using of trigonometric concepts are explained to students, these concepts may be learned better.

Students find it difficult to comprehend the idea of trigonometry thereby were unable to score high marks in the aspect in senior secondary certificate examination. WAEC Chief Examiner (2009, 2010, 2011, and 2012) has indicated that students generally performed poorly in the trigonometric aspects of School Certificate Mathematics Examination questions. Students were very weak in trigonometry and as such made unnecessary errors in their approach to obtaining the correct solutions in the topic. Candidate's inability



to interpret word problems and draw required diagrams correctly was observed especially bearing.

Trigonometry as an aspect of mathematics in secondary school in Nigeria faces several problems in relation to its instructional strategies and curricular content delivery by the mathematics teachers. Adepoju (2002) and Tella (2008) observed that trigonometry has been neglected by the learners and its content delivery by teachers. Studies on teaching qualification as determinant of students' performance were carried out on other aspects of mathematics but not on trigonometry as such this study intends to explore how teaching qualification determine students' performance in trigonometry among secondary students in Kano Metropolis, Kano State, Nigeria.

#### **Objective of the Study**

The objective of the study is to ascertain the difference in performance between various teachers' teaching qualifications and academic performance of senior secondary students in Trigonometry.

#### **Research Questions**

To guide the research work the following research question was formulated;

1. To what extent do teachers teaching qualifications predicts students' academic performance in trigonometry?

#### **Null Hypotheses**

The following hypothesis was formulated and tested at 0.05 level of significance.

**Ho<sub>1</sub>:** Teachers teaching qualification does not significantly predict students' academic performance in Trigonometry.

#### **RESEARCH DESIGN**

The research design for this study is descriptive survey of ex post facto type. A

descriptive study is one in which information is collected without changing the environment (no manipulation of the existing phenomena). Survey Designs collect descriptive data (study attitudes or values of a group, common practices of a group), may be used to describe elements of a specific group or generalize to a larger population and also may study relationships between/among variables.

The population for the study consists of all SS II students from the Senior Secondary Schools in Kano Municipal Education Zone numbering nine thousand eight hundred and seventy (9,870). The schools are located within Kano metropolis specifically in Kano municipal, Tarauni Dala and Nassarawa Local Government areas. The population of the study is from three public and three private schools. The schools are single type and comprise of three boys and three girls schools.

The sample of the study consists of three hundred and seventy (370) students (in accordance with Krejcie and Morgan (1970) and comprises of 185 male and 185 female students also 121 mathematics teachers were used for the study. The samples of the study were drawn from six Senior Secondary Schools randomly selected by picking from a hat procedure. A stratified sampling technique was used to select from the male and female strata. The sampled schools were Rumfa College, Kano, Murtala Muhammad Secondary School, Kano Capital Secondary School (Both boys and Girls), Shekara Girls Secondary school, and Fatima Muhammad Girls Secondary school Kano..

The instruments used for the study were Trigonometry Students Performance Test (TSPT) and Teacher' Qualifications Inventory (TQI). The data for the study were collected through administration of questionnaires for teachers and a performance test for the students. The data



with respect to teachers was obtained through the teacher characteristics (qualification) inventory developed by the researcher. The questionnaires were distributed to the mathematics teachers in the Kano Municipal Education, zone. The guide on how to respond to the questions was clearly stated on the introductory aspect of the inventory. The data from the students were obtained from the

Trigonometry Students Performance Test (TSPT) administration

The research work has one research question and one hypothesis and the hypothesis was tested at 0.05 level of significance. The research question was responded to through descriptive statistics (mean and standard deviation) while the hypothesis was analyzed using one way analysis of variance (ANOVA)

## RESULTS

**Table 2:** Mathematics Teachers Distribution by Qualification

Frequency	Percent	Valid Percent	Cumulative Percent
DIPLOMA	10	8.3	8.3
NCE	30	24.8	24.8
HND	24	19.8	19.8
BA/BSc	38	31.4	31.4
BAEd/BScEd	19	15.7	100.0
Total	121	100.0	100.0

Table 2 presented the distribution of mathematics teachers in accordance with their qualifications, and of the one hundred and twenty one (121) mathematics teachers, ten (10) obtained Diploma, corresponding to 8.3%; thirty (30) obtained Nigeria Certificate in education (NCE) corresponding to 24.8%; twenty four (24) obtained Higher National Diploma (HND) corresponding to 19.8%; thirty eight had either B A or B Sc which represents 31.4%

and nineteen (19) had either B A Ed or B Sc Ed degree respectively. From the table forty nine (49) mathematics teachers had education bias qualification (NCE and BAEd or BScEd).

**Research Question:** To what extent do teachers' teaching qualifications predict students' academic performance in trigonometry?

**Table 3:** Means and Standard Deviations of Students Academic Performance in Trigonometry in relation to Teacher Qualifications.

QUALIFICATIONS	N	MEAN	SD	MEAN DIFF	SEM
Diploma	10	13.8	2.573	0.69	0.814
NCE	30	13.4	2.568	1.09	0.469
HND	24	13.08	2.569	1.41	0.524
B.A/B.Sc.	38	13.82	3.328	0.67	0.54
B.A. Ed/B.Sc. Ed	19	14	3.742	0.49	0.858
Performance	121	14.49	3.243	0	
<b>Total</b>	<b>121</b>	<b>13.6</b>	<b>2.996</b>		<b>0.272</b>



Table 3 presented the means and standard deviations of students' academic performance in trigonometry in relation to the teachers teaching qualifications. From Table 3 the mean scores of students' academic performance in trigonometry are 14.49 (SD=3.243) while that of the teachers qualifications are 13.80 (SD=2.573) for Diploma, 13.40 (SD=2.568) for NCE, 13.08 (SD=2.569) for HND, 13.82 (SD=3.328) for BA/BSc and 14.00 (SD=3.742) for

BAEd/BScEd respectively. The mean difference (0.69) for Diploma, (0.67) for BA/BSc and (0.49) for BAEd/BScEd showed that teaching qualifications Diploma, BA/BSc and BSEd/BScEd are related to students' academic performance in trigonometry. In order to establish if the mean difference is statistically significant, one way analysis of variance was used and the data is in Table 4.

**Table 4:** Difference between teacher qualifications and students' academic performance in Trigonometry.

Source of variance	Sum of Squares	df	Mean Square	F	F-Crit	p	Decision
Between Groups	12.813	4	3.203				
Within Groups	1064.344	116	9.175	.349	5.6581	.844	accepted
Total	1077.157	120					

In Table 4, an independent samples one-way analysis of variance showed that there is no significant difference between the students' academic performance across the different teacher qualifications  $F(120) = 0.349$ ,  $p=0.844$  and  $F$  Crit (4, 116) = 5.681. Since  $0.844 > 0.05$ , therefore, the null hypothesis which states that there is no significant difference between teacher qualifications (OND, NCE, HND, B.A/BSc, and B.A (Ed) /B.Sc. (Ed.) and students' academic performance in trigonometry was retained.

**SUMMARY OF THE FINDINGS**

The main objective of the study was to and has investigated and analysed teachers teaching qualification as predictor of interest and performance in trigonometry among secondary students in Kano Metropolis. The finding of the study shows that teachers' qualifications are not predictors of students' performance in trigonometry,

**DISCUSSION**

Teachers' qualifications are essential in teaching. To qualify as a teacher

one has to obtain both the content and pedagogical knowledge. A certificate in education is necessary for becoming a qualified teacher capable of a successful teaching for the changing of behavior of learners.

The findings of this study agree with (Klicka, 2007) who established that there is no significant correlation between teacher qualifications and student learning. On the other hand, the study disagree with Goldhaber and Brewer (2000); Mayer, Mullens, and Moore (2000) and also Akinsolu (2010) who opined that research links students achievement to qualification of teachers and that there is a positive correlation between teachers' qualification and students' academic performance.

**CONCLUSION**

The study concludes that teachers teaching qualifications are not predictors of students' academic performance in trigonometry.

**RECOMMENDATION**

The study recommends that similar study should be conducted with the same

Corresponding author: Sumaila, M. U. ✉ [sumailamu@yahoo.com](mailto:sumailamu@yahoo.com) ✉ Kano State College of Education and Preliminary Studies. © 2020, Faculty of Technology Education, ATBU Bauchi. All rights reserved



or different scope, sample, location and instruments to find out more about the existence or non-existence of the relationship between teachers teaching qualifications and students' academic performance in trigonometry.

#### REFERENCES

- Akinsolu, A.O. (2010) Teachers and Students' Academic Performance in Nigerian Secondary Schools: Implications for Planning. *Florida Journal of Educational Administration & Policy*. Volume 3, Issue 2
- Akkoc, H. (2008). Pre-service mathematics teachers' concept images of radian. *International Journal of Mathematical Education in Science and Technology*, 39(7), 857 - 878.
- Delice, A. (2002). Recognizing, recalling and doing in the simplification of trigonometric expressions. *The 26th Annual Conference of the International Group for the Psychology of Mathematics Education (PME 26)*, the School of Education and Professional Development at the University of East Anglia, Norwich: England, 1, 247.
- Durmus, S. (2004). Matematikte ogrenmegucluklerinin saptanmasi uzerine bir calisma. *Kastamonu Egitim Dergisi*, 12(1), 125-128.
- Federal Republic of Nigeria. (2004) *National policy on education*. Yaba-Lagos NEBC Press.
- Goldhaber, D.D. & Brewer D. J. (2002). Does Teacher Certification Matter? High School Teacher Certification Status and Student Achievement. *Education Evaluation. Policy Analysis*. 22: 129- 145.
- Klicka, C. (2007). The Myth of Teacher Qualifications, *Current Issue Analysis Home School Legal Defense Association*.
- Orhun, N (2002). Solution of verbal problems using concept of least common multiplier (LCM) and greatest common divisor (GCD) in Primary School Mathematics and Misconceptions. Retrieved 6<sup>th</sup> September 2006 from <http://math.unipa.it/~grim/SiOrhun.PDF>.
- WAEC (2009 - 2012) Chief examiners report. General certificate of education/school certificate O level papers. WAEC. Lagos.