



Analysis of Mathematics Teachers' Competency in Lesson Delivery on Senior Secondary School Students in Askira/Uba Local Government Area, Borno State, Nigeria

Dr Marcel P. Agah

Faculty of Education,

Department of Science Education,

Adamawa State University, Mubi Adamawa State - Nigeria

ABSTRACT

The study examined the senior secondary school teachers' competency in the Mathematics lesson delivery to students' in Askira/Uba Local Government Area of Borno State. The survey research design was adopted to cover the senior secondary schools in the study area. The main objective of the study was to discover factors that the teachers take into account during lesson delivery in an attempt to explain the students' academic performance in mathematics over the years. To achieve this, three research questions were addressed and three hypotheses were tested in relation to the state of students' academic performance records in the subject over a period of time. The achievement of pupils in mathematics has piqued the interest of a variety of stakeholders in recent years, raising concerns about instructors' ability to present the subject. The instrument used for data collection was a questionnaire drawn for the study to pool information. Data collected were analysed to obtain descriptive statistics of percentages, means and standard deviation from the checklist the respondents completed in the questionnaire in order to answer the research questions. The hypotheses were tested by conducting t-Test at 0.05 level of significant. The results revealed that there is a link between teacher competence and students' academic success in Mathematics. This is related to the fact that a teacher's intellectual competency is a key factor in the level of education that kids get in school. A competent Mathematics teacher with the traits that enable him to inspire and develop the latent capacities of his students would automatically help greatly to the students' outstanding academic success in mathematics. Among others, the study therefore recommends that educational administrators should ensure that mathematics teachers are given appropriate orientation on the various aspect of lesson delivery and importance of facilities and instructional materials during teaching and learning. They should be made to go for periodic seminars, conferences, workshops and in – service training to help improve their teaching skills.

Keywords: *Teacher Competence, Mathematics, Academic Performance, Lesson Delivery, Qualification, Teacher Qualification and Teacher Experience.*

Introduction

The learning productivity in the Mathematics learning situation will be ideal only on the calibre of teachers who handle the subject. It is well known that only the competent teachers are likely to provide a good teaching that helps learners to achieve the educational goal. This is the type of teacher who prepares the lesson topic in a manner suitable to the learners in terms of a capacity to acquire the techniques and processes designed for learning the mathematical topics in the curriculum. Not surprisingly, the competency of the teacher is shown in how he/she shall align with the well known tradition of handling the learners as a parent and cautious supervision of the learning process. This is seen from the fact that the principal concern shall be to educate through supervising, monitoring and proper lesson delivery to achieve the educational goals (Rahaman, 2010).

The essence of having the professionally trained and certified teacher in the classroom is to emphasize that there is in place a person with a background to supervise and regulate the instructional process in the classroom. This is because teaching learning activities involve the teacher preparing lesson plans, provide for the use of instructional materials and employ proper teaching strategies that enhance meeting instructional goals. Without being equipped with these abilities and practice, it can only be imagined how the mathematics teacher would be able to assist the students to learn effectively. According to Arshad (2007), the competent teacher is one who has in-depth knowledge of subject matter, good teaching delivery skills grounded on classroom pedagogical principles that aid students' learning. All this is to emphasize that teaching competency relates with teaching effectiveness that will be shown from the outcome of the students' quality of learning.

Secondary school education frequently serves as a foundation for acquiring further knowledge and skills at tertiary institutes of learning. It is a foundation upon which future productive human capital is developed to meet the changing demands of a nation's labour market and economy. Secondary education, according to Kajuru, Ibrahim and Olaleye, (2015), is a critical tool for national development since it encourages individual worth and development in preparation for future education and development, as well as the overall development of society. In Nigeria education system, mathematics is a compulsory and an examinable subject offered at all levels of learning except for tertiary institutions where it is selective, yet requisite in some courses at different years of study.

Mathematics is one of the most important subjects in tertiary education. Hence, it is necessary to ensure that Mathematics teachers are competent enough for them to identify and provide the most important mathematical competencies that students should know (Dali, Daud, and Fauzee 2017). Mathematics plays a vital role in the development of individuals by providing powerful theoretical and computational techniques to advance their understanding of the modern world and societal concerns and to develop and manage the technology industries for the advancement of the national economy. In short, Mathematics is a language of science that is used to solve many real-world problems (Agah, 2019).

The achievement of pupils in mathematics has piqued the interest of a variety of stakeholders in recent years, raising concerns about instructors' ability to present the subject. Student achievement in mathematics, according to some experts, is a product of student effort, attitudes, interest in the topic, and intellectual ability, as well as the teacher's competence. There are numerous competency criteria necessary in the teaching profession when it comes to instructors' involvement in student achievement in mathematics. These standards address prerequisites for teacher competency, such as educational qualifications, training and professional development, and work-related experience (Trinder, 2008). Competent teachers who meet the profession's qualifications are regarded as "excellent" teachers who promote learning and demonstrate favorable characteristics by adhering to the profession's standards and norms (Zuzovsky, 2003). Hence the study, Analysis of Mathematics Teachers' Competency in Lesson Delivery on Senior Secondary School Students in Askira/Uba Local Government Area, Borno State,

Statement of the problem

The growing rate of students' failure in Mathematics with no sign of decline over the years suggested a serious matter for concern. This is even against the backdrop that Mathematics in the Senior Secondary Certificate of Education examination is a crucial subject required to qualify for admission into tertiary education in the science field. With the expectation that the teacher's primary function is the transmission of knowledge and skills to learners, efficiency in the service delivery remains an important dimension. How can that be expected if the teacher did not have the academic and professional

qualification in the first place? Beyond just academic qualification, a teacher has to be professionally groomed in terms of skills to handle the teaching of Mathematics (Agah, 2019)

Students in mathematics have a deficiency and poor academic performance, which could be due to a lack of teacher competency and learning resources in our classrooms. It has also been discovered that many people who teach Mathematics in secondary schools are not qualified Mathematics teachers. This might be one of the reasons for the poor performance of students in the subject. Against that backdrop, this study carries out an analysis of the Mathematics teachers' competency in lesson delivery on senior secondary school students in Askira/Uba Local Government Area of Borno State, Nigeria. This is with the aim to identify the contributory factors to persistent underperformance of the students in Mathematics and thereby suggest the way forward.

Purpose of the study

The main purpose of the study is to analyze the teachers' competency in Mathematics lesson delivery on senior secondary school students in Askira/Uba Local Government Area of Borno State Nigeria. The specific objectives are to:

- i. To investigate the influence of teacher's competence on students' academic performance in Mathematics.
- ii. To examine the influence of teacher's qualification on the academic performance of students in Mathematics.
- iii. To determine the influence of teachers' experience on the academic performance of students in Mathematics.

Research Questions

The study is guided by the following research questions:

Research Question 1: What is the influence of teacher's competence on students' academic performance in Mathematics?

Research Question 2: What is the influence of teacher's qualification on the academic performance of students in Mathematics?

Research Question 3: What is the influence of teachers' experience on the academic performance of students in Mathematics?

Research Hypotheses

The following hypotheses were formulated to guide the study tested at 0.05 level of significant

H₀₁: There is no significant difference between teachers' competence and students' academic performance in Mathematics.

H₀₂: There is no significant difference between the academic performance of Mathematics students taught by qualified teachers and those taught by unqualified teachers.

H₀₃: There is no significant difference between the academic performance of Mathematics students' taught by experience teachers and those taught by in-experienced teachers.

Scopes and Delimitation of the study

The study cover the teachers' competency in lesson delivery on senior secondary school students in Askira/Uba Local Government Area, Borno State and it is limited to five (5) selected secondary schools.

Methodology

The study adopted a survey research design. The decision to adopt this design is in agreement with Adetoro (2009) who described a survey study as one that allows the use of questionnaire and interview to elicit information from respondents. The population of this study consists of all Mathematics students in Askira Uba Local Government Area, Borno State.

The sample for this study includes SS II and Biomathematics students from each of the five purposefully sampled schools in the study area. The questionnaire contained several items reflecting the research objectives. The items were to provide answers for the research questions and pave the way for testing the research. This instrument was initially pilot tested in Mubi South Local Government Area of Adamawa State which is not part of the study area. By use of the Cronbach alpha analysis, a coefficient of 0.76 was obtained. This coefficient was considered having adequate reliability to conduct the study. The researcher personally administered the questionnaire with the help of a research assistant who helped to collect the completed materials from respondents in each school

The data collected were analysed using Statistical Package for the Social Sciences (SPSS). The descriptive statistics of means and standard deviation were used to answer the research questions. The analysis of variance (ANOVA) was used for testing the hypotheses as was necessary. Each hypothesis was tested at 0.05 level of statistical analysis.

RESULTS AND DISCUSSION

Research Question 1: What is the influence of teacher's competence on students' academic performance in Mathematics?

Table 1: Mean and standard deviation of responses to Research question 1

Items	N	Mean	S.D	Remark
Mastery of the subject matter is one of the most important aspects of teachers' competence	100	3.341	.665	Accepted
Competent teacher should possess the ability to breakdown the subject matter.	100	2.780	.716	Accepted
Competent teachers allow their students to understand clearly the content of what is taught	100	2.650	.858	Accepted
Competent teachers are expected to possess the rudimental knowledge and skills in their subjects	100	3.317	.467	Accepted
Effective teaching demands that the teacher should have a sound knowledge of all that the students must know in and outside the school curriculum	100	2.633	.925	Accepted

*Accepted ($\bar{x} = 2.5$ and above); Rejected ($\bar{x} =$ less than 2.5)

Table 1 show that the mean and standard deviation of the responses to research question 1. With a mean of 3.341 and a standard deviation of .665, it was accepted that mastery of the subject matter is one of the most important aspects of teachers' competence. Also, with a mean of 2.780 and a standard deviation of .716, it was accepted that competent teacher should possess the ability to break down the subject matter. Competent teachers are expected to possess the rudimental knowledge and skills in their subjects was accepted having a mean of 2.650, and a standard deviation of .858, also with a mean of 3.317 and a standard deviation of .467, it was accepted that effective teaching demands that the teacher should have a sound knowledge of all that the students must know in and outside the school curriculum.

Research Question 2: What is the influence of teacher's qualification on the academic performance of students in Mathematics?

Table 2: Mean and Standard Deviation of Responses to Research Question 2

Items	N	Mean	S.D	Remark
There are qualified Mathematics teachers in my school	100	2.351	.915	Rejected
Mathematics students taught by student-teachers perform poorly in the subject	100	2.608	.600	Accepted
Mathematics students taught by regular teachers perform better than the ones taught by student teachers	100	2.500	.760	Accepted
Students performance in Mathematics cannot be blamed on teacher's qualification or experience but on the student themselves	100	2.433	.753	Accepted
Students enjoy & learn better when they are taught by regular teachers than student-teachers	100	2.458	1.098	Rejected

*Accepted ($\bar{x} = 2.5$ and above); Rejected ($\bar{x} =$ less than 2.5)

Table 2 is the mean and standard deviation of the responses to research question 2. For the first item "There are qualified Mathematics teachers in my school with a mean of 2.351 and a standard deviation of .915. Also, with a mean of 2.608 and a standard deviation of .600, it was accepted that Mathematics students taught by student-teachers perform poorly in the subject. Mathematics students taught by regular teachers perform better than the ones taught by student teachers as accepted having a mean of 2.5002, and a standard deviation of .7604.

Also, with a mean of 2.433 and a standard deviation of .753, it was rejected that Students performance in Mathematics cannot be blamed on teacher's qualification or experience but on the student themselves, while with a mean of 2.358 and a standard deviation of 2.458 it was rejected that Students enjoy & learn better when they are taught by regular teachers than student-teachers.

Research Question 3: What is the influence of teachers' experience on the academic performance of students in Mathematics?

Table 3: Mean and Standard Deviation of Responses to Research Question 3

Items	N	Mean	S.D	Remark
Teacher's teaching style is the reason you perform well in Mathematics.	100	2.158	.799	Rejected
Student perform better in Mathematics if your teacher changes his/her style of teaching the subject	100	1.942	.919	Rejected
Effective teaching and learning of Mathematics does not necessarily need facilities	100	2.367	.929	Rejected
Effective teaching and learning of Mathematics requires facilities	100	2.692	1.197	Accepted
Mathematics students who are not taught the practical aspect will not perform well at the subject	100	2.025	.716	Rejected

*Accepted ($\bar{x} = 2.5$ and above); Rejected ($\bar{x} =$ less than 2.5)

Table 3 shows that are the mean and standard deviation of the **responses** to research question 3. Also, with a mean of 2.158 and a standard deviation of .799, it was rejected that Teacher's teaching style is the reason you perform well in Mathematics, while with a mean of 1.941 and a standard deviation of .919 it was rejected that Student perform better in Mathematics if your teacher changes his/her style of teaching the subject. With a mean of 2.367 and a standard deviation of .929, it was rejected that effective teaching and learning of Mathematics does not necessarily need facilities, while with a mean of 2.691 and a standard of 1.197 was accepted that Effective teaching and learning of Mathematics requires facilities.

H01: There is no significant difference between teachers' competence and students' academic performance in Mathematics.

Table 4: F-Statistic analysis for between teachers' competence and students' academic performance in Mathematics

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	1.821	1	1.821	8.182	.005
Within Groups	36.493	99	.223		
Total	38.313	100			

Table 4 shows the impact of the value obtained from F-statistic computed is 8.182 and the corresponding P-value obtained is 0.005 which is less than the 0.05 level of significance. This implies that there is significant relationship between teachers' competence and students' academic performance in Mathematics

H02: There is no significant difference between the academic performance of Mathematics students taught by qualified teachers and those taught by unqualified teachers.

Table 5: F-statisticfor Mathematics students taught by qualified teachers and those taught by unqualified teachers

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.299	1	.075	.312	.869
Within Groups	38.544	99	.239		
Total	38.843	100			

The F-statistic in Table 5 is 0.312 and the corresponding P-value is 0.869. The P-value indicates that there is a correlation between Mathematics students taught by unqualified teachers and those taught by unqualified teachers.

H0₃: There is no significant difference between the academic performance of Mathematics students' taught by experience teachers and those taught by inexperienced teachers.

Table 6: F-statistic on Mathematics students taught by experience teachers and those taught by inexperienced teachers.

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	1.008	4	.252	1.079	.369
Within Groups	37.577	99	.233		
Total	38.584	100			

The F-statistic obtained is 1.079 and the P-value is 0.369. The P-value is greater than 0.05 at 5% level of significant. Therefore, the academic performance of students has no significant impact on students' taught by experience teachers and those taught by inexperienced teachers.

Discussion

The societal implications of determining the ability of Mathematics teachers during instruction are significant. The educational attainment of learners, according to Henderson and Rodrigues (2008), may be influenced by teacher competence, particularly in mathematics instruction. Furthermore, they discovered that confidence is another important factor that influences the degree of competence of Mathematics teachers, according to 95 percent of student responses. There are a number of ways that can be used to increase Math teachers' classroom proficiency. Santagata and Yeh (2016) revealed the role of perception, interpretation, and decision making for Math teachers to reflect on their own teaching and improve their teaching abilities. Parallel lesson study was advocated by Huang and Han (2015) to improve the competency of Mathematics teachers, while Oonk et al., (2015) underlined the need of widening practical knowledge.

The results of hypothesis one revealed that there is a link between teacher competence and students' academic success in Mathematics. This could be related to the fact that a teacher's intellectual competency is a key factor in the level of education that kids get in school. A competent Mathematics teacher with the traits that enable him to inspire and develop the latent capacities of his students would automatically help greatly to the students' outstanding academic success in mathematics. Students' performance is also boosted by teachers' ingenuity, strong teaching abilities, and appropriate evaluation. This is consistent with Ivowi's (1999) finding that there is a significant link between instructor ability and student performance.

This is also in line with Inyang's (1997) results that teaching is more effective when the teacher uses instructional resources. The results of hypothesis two revealed that there is a considerable difference in performance between pupils who are taught by qualified instructors and those who are taught by unqualified teachers in Mathematics. This could be attributed to the fact that a skilled teacher is able to translate knowledge, abilities, attitudes, and beliefs into professional principles. A trained teacher has solid classroom management skills, effective communication skills, adequate topic knowledge, and the ability to use a variety of teaching tactics to improve students' performance. This is consistent with James' (1991) findings that all instructors require breadth and depth in the subjects they will teach, as well as an awareness of new knowledge, which necessitates a high level of professional certification.

The results of hypothesis three revealed that there is a substantial difference in academic achievement between students taught by experienced instructors and students taught by novice teachers in Mathematics. Students who were taught mathematics by professional teachers outperformed those who were taught by novice professors. This could be related to the fact that the quality of education and instruction is determined by the teacher's ability to organize the materials at his or her disposal. This could be related to the fact that the quality of education and instruction is determined by the teacher's ability to organize the materials at his or her disposal. The teacher must have a lot of experience in this area. When the teaching process is successful and efficient, the students' and indeed the learners' performance are ensured. This is consistent with Abe (2014) findings, which found that students taught by experienced teachers outperformed those taught by inexperienced teachers.

Conclusion

Based on the findings, the following conclusions were made, it is evident that there is a significant relationship between teachers' qualification/experience and students' performance in Mathematics, also there is a significant relationship between facilities and the effective teaching and learning of Mathematics and there is a significant relationship between teachers' method of teaching Mathematics and students' performance.

Recommendations

The following recommendations have been made;

Government through the Ministry of Education should ensure that qualified and experienced teachers be employed into the school system. According to Abe (2014) teacher's qualification can be quantified into the following; level of education, years of experience in preparation of subject matter and pedagogy and; certification in their expertise area and their ongoing professional development.

Again, facilities in schools are inadequate and this has hitherto hindered the process of teaching and learning. Thus, the federal and state government should ensure they renovate existing and build new facilities to further consolidates the process of teaching and learning.

Teachers should improve on their teaching methods or styles; it has been validated by this research that there is a direct link between teaching method of teacher and students' performance in the subject.

Educational administrators should ensure that school teachers are given appropriate orientation on the various uses and importance of facilities and instructional materials during teaching and learning. They should be made to go for periodic seminars, conferences, workshops and in – service training to help improve their teaching skills.

REFERENCES

- Abe, T. O. (2014). The Effect of Teachers' Qualifications on students' performance in Mathematics. *Sky Journal of Educational Research* 2 (1), 10-14.
- Adetoro, J. A. (2009). *Resource management in education*. In J.B.Babalola and A.O. Ayeni (Eds), *Educational Management: Theories and Tasks*. Ibadan, Nigeria: Macmillan Publishers Limited.
- Agah, P. M. (2019). Improving students' performance through using models in teaching solid geometry in junior secondary schools in Hong Local Government Area, Nigeria. *Asian Journal of Education and Social Studies* 3(4); 1-7.
- Arshad, M. (2007). *Evaluative Study of Secondary School Teacher's Competency in English University of Arid Agriculture*. Rawalpindi Institute of Education and Research.
- Dali, P. D., Daud, K., & Fauzee, M. S. O. (2017). The relationship between teachers' quality in teaching and learning with students' satisfaction. *International Journal of Academic Re-search in Business and Social Sciences*; 7(7), 603-618.
- Henderson, S. & Rodrigues, S. (2008). Scottish student primary teachers' levels of Mathematics competence and confidence for teaching Mathematics: Some implications for national qualifications and initial teacher education. *Journal of Education for Teaching*, 34(2) 93-107.
- Huang R. & Han, X. (2015). Developing Mathematics teachers' competence through parallel lesson study. *International Journal for Lesson and Learning Studies*. <https://doi.org/10.1108/IJLLS-10-2014-0037>.
- Inyang, N. E. U., (1997). *Local Materials in Science, Technology and Method of Teaching, Identification and Utilization*. Proceedings of the 38th Annual Conference of STAN, 64 – 67.
- Ivowi, V.M.O. (1999). *Beyond enriching Science, Technology and Mathematics Educational Content*. The 40th Annual Conference Proceedings of Science Teachers Association of Nigeria.
- James, T., (1991). *Inquiry Versus Lecture Method of Teaching Biology Among Low and High Achieving Male and Female Students in Secondary Schools*. Unpublished M.Ed. Thesis, Ahmadu Bello University, Zaria.
- Kajuru, Y. K., Ibrahim, M. O. & Olaleye, O. O. (2015). Effects of teachers' qualification and competency on performance in Further Mathematics among senior secondary school

students in Kaduna State. *Nigeria. International Journal of Educational Research and Information Science*, 2 (4), 93-97.

Oonk W., Verloop, N. & Gravemeijer, K. P., (2015). Enriching practical knowledge: Exploring student teachers' competence in integrating theory and practice of Mathematics teaching. *Journal for Research in Mathematics Education*, 46(5). 559-598.

Rahaman, O. (2010). Teacher as a key factor affecting learning posted: Thursday, <http://searchwarp.com/swa596810-Teacher-As-A-Key-Factor-Affecting-Learning.htm>

Santagata R. & Yeh, C. (2016). The role of perception, interpretation and decision making in the development of beginning teachers' competence. *ZDM*, 48(1-2). 153-165.

Trinder, J.C. (2008). *Competency standards: A measure of the quality of a workforce*. The International Archives of the Photogrammetry. Remote Sensing and Spatial Information Sciences.

Türkmen, H. & Kandemir, E. M., (2011). Case study on perceptions of teachers on scientific process skills learning domain. *Journal of European Education*, 1(1). 15-24.

Varvel, C. (2013). Pedagogical Roles and Competencies of University Teachers Practicing in the E-Learning Environment. 14(3).

Zuzovsky, R. (2003). *Teachers' qualifications and their impact on student achievement: Findings from TIMSS 2003 data for Israel*. Center for Science and Technology Education. Tel Aviv University, Tel Aviv, Israel. Pp. 37-62.

