



# THE MATHEMATICS TEACHERS' COMPETENCY NEEDS FOR THE IMPLEMENTATION OF MATHEMATICS CURRICULUM

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## ABSTRACT

The study examined the mathematics teachers' competency need for the implementation of mathematics curriculum. Two research questions and two research hypotheses were posed to guide the study. The study adopted survey research design. All the mathematics teachers from 54 secondary schools in Oyo north educational zone of Oyo state form the population of the study. The study sample comprised 80 mathematics teachers (grouped into qualified and

## INTRODUCTION

In the history of educational development all over the world and particularly developing countries like Nigeria, mathematics education has been of great concern to the generality of the people. This is obvious in the sense that a lot of tasks in the educational world lend themselves to mathematics and has made people realize the indispensable role that the knowledge of mathematics can play. Mathematics is the bedrock of science and technology, without which there shall be no development (Steen, 2010). Mathematics is a way of describing relationships between number and other measurable quantities. Azuka (2013) sees mathematics as not only the language of the science, it is essential nutrient for thought, logic, reasoning and therefore, progress.

Mathematics is not a classroom discipline alone but what everybody needs at all time, it cuts across all filed of human endeavour. Nwagbara, Bassey and Enum (2013) emphasized that where there is no mathematics, there is no science, where there is no science, there is no technology and that absence of technology implies absence of development. Modern technology development, as it is known has its root from scientific inventions. The line demarcation between the developed and the underdeveloped nation is based on their level of mathematical attainment and ingenuity (Ale & Lawal, 2010). This is the reason why mathematics is made compulsory



*unqualified using stratified sampling technique). The instrument for collecting data was Mathematics Teachers' competency Needs for planning Instruction Questionnaire (MTCNQ) with reliability coefficient of 0.92 obtained from Cronbach alpha. Descriptive Statistic of mean and standard deviation was used to answer the research questions while inferential statistic of t-test was used to answer the research hypotheses. It was found that mathematics teachers' qualification is one of the competency needs for planning and delivery of instruction. It was recommended among others that government should recruit qualified mathematics teachers, encourage mathematics teachers to attend seminars and conferences to update their knowledge.*

**Keywords:** *Mathematics Teachers', Competency, Needs, Implementation, Curriculum.*

both at primary and secondary schools level of education in Nigeria.

The word curriculum indicates the minimum content to be taught in the school in order to achieve the objectives of senior secondary school programme. According to Usman, Ogbu and Achanya (2012), represents the total experiences to which all learners must be exposed. It includes the contents, achievement objectives, activities for both teachers and learners, teaching and learning materials and evaluation guide. Mathematics curriculum emerged in Nigeria as a response to global trend in mathematics teaching and learning and national cry to develop an indigenous mathematics education programme (Adeneye, 2012). However, the twenty first century, witnessed a worldwide reform in mathematics education. The reform led to emergence of modern mathematics curriculum in the early 1950s and reached its climax in the 1960.

The reform became more intensified in the 1960s as a result of successful launching of the sputnik, the first earth satellite in space in November 1957. This generated worldwide awareness and interest in mathematics, science and technology to the extent that various countries throughout the world started to critically review and enrich their mathematics curriculum in order to experience breakthrough in the scientific and technological development (Adeneye, 2012). There was also the formation of Mathematical Association of Nigeria (MAN and Science Teachers Association of Nigeria (STAN) whose efforts were in the development and improvement of mathematics and science teaching in secondary schools (Awofala & Awolola, 2011).

Curriculum implantation is one of essential elements in the achievement of educational goals and objectives. Mkpa (2007) defined curriculum implementation as the task of translating the curriculum document into operating curriculum by the combined efforts of the teachers, students and others concerned. This implies that curriculum implementation demands concerted efforts of end-users of the curriculum for its



effective implementation at all levels in order to achieve the desired goal. In essence, effective mathematics curriculum implementation involves effective and efficient interactions between teachers, learners and other stakeholders in education geared towards achieving the objectives of teaching and learning of mathematics in secondary school. According to Obinna and Anne (2011), problem of unqualified mathematics teachers constitute a major setback in effective mathematics curriculum implementation. Teachers are important factors in education and they are the pivot on which the educational process hang. They can influence the teaching- learning outcomes either positively or negatively. They determine the quality of instructional delivery and also influence quality education when it comes to implementation of the curriculum and educational policies (Ofojebe & Ezugoh, 2010). Also, they are the major factor in determining the achievement of students in either internal or external examination. Supporting this, WAEC Chief Examiners Report (2016) pointed out that poor academic achievement of students in mathematics was attributed to poor methods of teaching, inadequate preparation for examination by students and teachers not using appropriate instructional materials and strategies.

Presently, the minimum qualification of teachers of mathematics in senior secondary schools is bachelor's degree in mathematics education or mathematics. Other qualifications are post graduate diploma in Education and Masters in Education. Mathematics teachers with bachelor's degree in mathematics education and above are expected to be intellectually grounded and professionally competent to teaching mathematics at senior secondary schools (NPE, 2014).

Various researchers have carried out investigation on effects of teachers qualification on teachers competency. Nambira (2016) submitted that predictor variables such as gender, teacher qualification, teaching experience, field of study, and region exerted on the way teachers plan and prepare the lesson, deliver the lesson, assess and evaluate learners, use the teaching materials, and the quality of work. Teachers who specialized in mathematics were more competent in mathematics teaching. Also, Olaleye (2015), reported that that there was significant difference between students' achievement and teachers' qualification.

It is therefore necessary to determine the influence of educational qualification on mathematics teachers' competency needs in implementation of national mathematics curriculum in Nigeria. Hence, this study strives to ascertain the mathematics teachers competency needs for the implementation of mathematics curriculum for senior secondary school across teachers' qualifications.

### **Statement of the Problem**

The main objective of mathematics education programmes of various institutions of learning in Nigeria is to make students understand mathematics and apply it to everyday



activities. Unfortunately, such variables as difficult nature of mathematics and lack of qualified and trained mathematics teachers in the schools have been reported as the cause of inability of mathematics curriculum objectives to be achieved. As a result of these, students' understanding and achievement in the subject is generally poor. Notably, among the variables for this poor achievement are teachers' qualifications, syllabus coverage (implementation) and experience.

Therefore, the problem addressed in this study is, "what then are the competencies needed by mathematics teachers at secondary school level for effective implementation of senior secondary school mathematics? And to what extent are these dependent on their qualifications?"

### **Research Questions**

The following research questions guided the study.

1. To what extent is senior secondary school mathematics teachers' qualification influence competencies needs in planning mathematics instruction?
2. To what extent is senior secondary school mathematics teachers' qualification influence competencies needs in delivery mathematics instruction?

### **Research Hypotheses**

The following null hypotheses were tested at 0.05 level of significance

- $H_1$  : There is no significance difference in the mean response scores of qualified and unqualified mathematics teachers on the competencies needs in planning mathematics instruction.
- $H_2$  : There is no significance difference in the mean response scores of qualified and unqualified mathematics teachers on the competencies needs in delivery mathematics instruction.

### **Methodology**

Descriptive survey design was adopted for the study. The population of the study consists of all 115 mathematics teachers from 54 secondary schools in Oyo north educational zone of Oyo state. Stratified sampling technique was used to grouped respondents into qualified and unqualified mathematics teachers. Forty qualified mathematics teachers comprising those with: (BScEd and BSc/PGDE) in mathematics and 40 unqualified mathematics teachers comprising those with: (NCE, B Sc. and HND) in other fields of specialization. This brings the study sample to eighty (80) teachers. Mathematics Teachers' competency Needs for planning Instruction Questionnaire (MTCNQ) was the research instrument for data collection and face validation was carried out by two experts in mathematics education and one expert in Education Measurement and Evaluation. Trial testing of the instrument was done at Oyo East Local Government Area of Oyo State on



30 mathematics teachers using Cronbach alpha formular, a reliability value of 0.83 was obtained. The research instrument used in collecting data was a self designed questionnaire to elicit the required information from the respondents. The instruments was carefully structured and constructed on necessary steps for planning and delivery of concepts of geometry. The instrument consists of two sections, in which the first section seeks information on the qualification of teachers while the other aspects contain items on the question on the teacher competency needs for planning and delivery instruction. The items in the questionnaire were arranged on a four point scale of: Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree to which the respondents were required to tick which option was applicable to them and supply information where needed. A decision rule was derived by adding the assigned values and dividing it by the number of scores. Therefore any score below 2.5 is interpreted as rejected and 2.5 and above interpreted as accepted. Mean was used to answer the research questions and t-test of independent sample was used to test the null hypotheses at 0.05 level of significance.

## Results

**Research Question 1:** To what extent is senior secondary school mathematics teachers' qualification influence competencies needs in planning mathematics instruction?

**Table 1:** Mean rating of teachers on the extent to which mathematics teachers qualification influence competencies needs in planning mathematics instruction.

S/N	Item Statement	Mean	SD	Decision
1	The objectives of the geometric construction is clearly stated in terms such as: construct etc.	3.07	0.74	SA
2.	The stated objectives of geometric construction are in achievable terms, given period and available resources.	2.95	0.71	SA
3.	The specific learning activities to be carried out by the learners to achieve the objectives were planned for in the lesson.	2.87	0.82	A
4.	The plan to assess students understanding of the geometric construction is well developed.	2.97	0.82	SA
5.	The plans for the provision of feedback on the assessment on the topic were provided for in the lesson plan.	2.91	0.81	SA
6.	The plan to sequence the lesson in an engaging manner to gain attention of students in geometric construction is well cater for in the lesson plan.	2.89	0.78	A



7	There is an opportunity to stimulate recall of prior knowledge and resent content in the lesson plan.	3.22	0.82	SA
8.	There is plan to create a realistic time line; ability to estimate how much time each of the activities on the topic will take to achieve the objectives.	2.92	0.80	SA
9.	In the plan, few minutes at the end of class to answer any remaining questions and sum up key points on the lesson were provided.	2.96	0.76	SA
10	For a lesson closure, there is plan to emphasize key information and correct students misconception on the topic.	2.94	0.82	SA

Grand Mean Score = 2.93

Result on Table 1 showed that in items 1-10 had the mean scores ranges from 2.87 to 3.07 and standard deviations ranges from 0.72 to 0.82. The respondents in items 3 and 6 agreed that the items statement agreed that senior secondary school mathematics teachers qualification is one of the competency needs in planning mathematics instruction. Also, the respondents in items 1, 2, 4, 5, 7, 8, 9 and 10 strongly agreed that the items statement agreed that senior secondary school mathematics teachers qualification is one of the competency needs in planning mathematics instruction. The grand mean of all the respondents of 2.93 which is greater than benchmark of acceptance. Therefore senior secondary mathematics qualification is relevant in competency needs for planning of mathematics instruction.

**Research Question 2:** To what extent is senior secondary school mathematics teachers' qualification influence competencies needs in delivery mathematics instruction?

**Table 2:** Mean rating of teachers on the extent to which mathematics teachers qualification influence competencies needs in delivery mathematics instruction.

S/N	Item Statement	Mean	SD	Decision
1	Mathematics teacher guide the students in reviewing steps involved in bisecting a line segment.	3.12	0.76	SA
2.	The teacher reviewing steps involved in bisecting and constructing angles and some special angles like $45^\circ$ , $60^\circ$ etc.	2.95	0.82	SA
3	The teacher constructs triangle and guides construction activities of students of triangle by inspection and make correction.	2.90	0.75	SA



4.	The teacher lists steps involved in constructing 4-sided plane figures and construct plane figures.	2.81	0.82	A
5.	The teacher explain steps involving in constructing locus of moving points equidistance from 2 points.	2.74	0.84	A
6	Mathematics teacher list steps involved in constructing locus of moving points equidistance from 2 lines.	2.63	0.81	A
7	The teacher demonstrate the construction of locus of points equidistance from 2 points on the chalkboard using mathematical sets.	2.97	0.77	SA
8.	The teacher demonstrates the construction of locus of points equidistance from 2 lines on the chalkboard using mathematical set.	3.02	0.75	SA
9	The teacher inspects student's construction activities with mathematical set.	2-96	0.85	SA
10	Mathematics teacher re-demonstrate the steps most students found difficult on the chalkboard.	2.90	0.79	SA

Grand Mean Score = 2.94

Result on Table 2 indicated that the respondents in items 4-6 agreed with statements on competencies by mathematics teachers while others responses strongly agreed with statements. The grand mean score of all the respondents is 2.94 which is greater than 2.50 benchmark of acceptance. Therefore, senior secondary school mathematics teachers qualification influence their competency needs in delivery mathematics instruction.

### Hypothesis One

There is no significance difference in the mean response scores of qualified and unqualified mathematics teachers on the competencies needs in planning mathematics instruction.

**Table 3:** t-test of independent sample on the significant difference in the mean scores of qualified and unqualified mathematics teachers on the influence of qualification on competency needs of mathematics teachers in planning mathematics instruction.

Variables	N	Mean	SD	t-cal	df	P Value	Decision
Qualified	40	2.8457	0.2843	5.768	78	0.000	H <sub>0</sub> Rejected
Unqualified	40	2.6657	0.2667				



Result on table 3 showed that was significant difference in the mean scores of qualified and unqualified mathematics teachers on the influence of qualification on competency needs of mathematics teachers in planning mathematics instruction. The hypothesis one is rejected because  $t(78) = 5.768$ ; sig (2-tailed) = .000 and  $p < 0.05$  testing level.

### Hypothesis Two

There is no significance difference in the mean response scores of qualified and unqualified mathematics teachers on the competencies needs in delivery mathematics instruction.

**Table 3:** t-test of independent sample on the significant difference in the mean scores of qualified and unqualified mathematics teachers on the influence of qualification on competency needs of mathematics teachers in delivery mathematics instruction.

Valriables	N	Mean	SD	t-cal	df	P Value	Decision
Qualified	40	2.6757	0.2446	4.624	78	0.004	H <sub>0</sub> Rejected
Unqualified	40	2.5680	0.2397				

Result on table 3 showed that was significant difference in the mean scores of qualified and unqualified mathematics teachers on the influence of qualification on competency needs of mathematics teachers in delivery mathematics instruction. The hypothesis two is rejected because  $t(78) = 4.624$ ; sig (2-tailed) = .004 and  $p < 0.05$  testing level.

### Discussion and Conclusion

The researcher was able to found out that teachers' qualification influence the competency needs of mathematics teachers in planning and delivery of mathematics instruction. A qualified mathematics teacher will be able to plan his/her mathematics teaching, prepare well for the lesson and follow the lesson to delivered the lesson according to the lesson plan. This finding is in agreement with the finding of Namibira (2016) while working on the extent to which predictors of teachers' competencies in teaching mathematics predict the outcomes of mathematics achievement among learners at upper primary phase. The finding of this study revealed that teachers who specialized in mathematics were more competent in mathematics teaching. In conclusion, findings of this study confirmed that qualification of mathematics teachers influence the competency of teachers in planning and delivery mathematics instruction.

### Recommendations

The following recommendations were made based on the findings:



- Government through the educational ministry should recruit mathematics teachers that specialized in mathematics education.
- Mathematics educators should make use of appropriate teaching method and strategies such as brainstorming, discussion, group work, field trip and so on that will motivate, sustain interest and retention of the learners.
- Mathematics teachers' should endeavor to update their knowledge by attending conferences, seminars and workshops organize by professional bodies like MAN, STAN, etc.
- Teachers' training institutions should prepare quality mathematics teachers by enriching teachers training curriculum programmes so as to strengthen the abilities, knowledge and skills of students teachers.

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