



## SURVEY OF INSTRUCTIONAL MATERIAL NEEDS OF MATHEMATICS TEACHERS IN SECONDARY SCHOOLS IN OYO STATE

**FEHINTOLA, J.O.**

*Dept. of Counselling & Human Development Studies  
University of Ibadan, Ibadan,  
Nigeria*

*telephone number: 08162023919/08056240315*

*E-Mail: fehintola.j@dlc.ui.edu.ng/jof677@yahoo.com/joseph.fehintola@gmail.com*

### ABSTRACT

*This study examined the availability of instructional material needs of mathematics teachers in teaching mathematics in secondary schools. Several instruments are required by the mathematics teachers to teach mathematics effectively. This study made use of descriptive research design of survey type and the population of interest is the mathematics teachers in senior public secondary school. The sample is made up of 80 Mathematics teachers. Simple random sampling technique was used to select the teachers. Data were collected through the use of questionnaire. Section A consists of socio-demographic information while Section B consists of checklists of Instructional materials needed for teaching Mathematics effectively by the Mathematics teachers. The findings of the study showed that there are little or no availability of instruments needed by mathematics teachers, the available ones are not adequate to teach mathematics in the schools sampled and that the available ones cannot be utilized by the teachers. Based on these findings and conclusion researcher made the following recommendations that trained mathematics teachers should be allowed to teach Mathematics in various secondary schools regardless of the location and size of the school for effective teaching of the subject. Workshops and in-service training or refreshers course for mathematics teachers should be put in place to keep mathematics teacher update on how to use instructional material when teaching for effective and to enhance high academic performance in the subject*

### INTRODUCTION

Mathematics is used as a basic entry requirement into any of the prestigious courses such as medicine, architecture and engineering among other degree programmes. Despite the important of this subject, it has become an almighty work for the students. A lot of students do not enjoy the subject, except few who are in science class, who have no option than to like the course base on the fact that there is more technical subject like Further Mathematics.

Despite the important role that Mathematics plays in society, there has always been poor performance in the subject at national examinations (Aduda, 2003). There is no gain saying that mathematics is a very important subject. It is the foundation of science and technology and the functional role of mathematics to science and technology is multifaceted and multifarious that no area of science, technology and business enterprise escapes its application (Okereke, 2006).

Some questions have always been arising; why is Mathematics difficult to pass? Why is the lack of interest towards the course? Why the course is made important? Despite the importance placed on mathematics, researchers (Amazigo, 2000; Obioma, 2005; Okereke, 2006) had observed that students lack interest in the subject and perform poorly in it. Obodo (2001) asserted that the importance of mathematics education in Nigerians educational system and the nation's technological development has been recognized. This is why mathematics was considered as one of the most important subject in Nigerian schools. According to Odumosu(2012) Mathematics has been regarded as the bedrock of science and technology. Fasasi (2009) supported this fact when he noted that the progress of science could be determined by the extent to which mathematics has entered into its methods and contents. In a similar view, Mathematics is regarded as the major tool available for formulating theories in the Science, Engineering, and Economics as well as in other fields (Abiodun, 2007). Useni (2012), revealed that Mathematics has always been regarded as the language of science and without any doubt remains the most serviceable science subject to all discipline and field of human work and study. Sam (2006), opined that mathematics is the queen of science and technology and also a tool for scientific and technological development. Stephen (2009) described mathematics as the mother of all sciences and that diverse phenomenon in

physical, biological and economic situations can be communicated through the concept of shape, quantity, size and order.

This is further buttressed by the reports of the Chief Examiners to the senior secondary school WAEC results. WAEC result updates May/June result statistics for the 2015/2016 have been announced by the Head of National Office, WAEC. Indicated that 53 per cent of the participants had credits in 5 subjects and above, including English language and Mathematics.

Table1: Number of Candidates with Five Credits and above including English language and Mathematics from 2006 -2015

YEAR	NUMBER OF CANDIDATES	NUMBER OF CANDIDATES WITH 5 CREDITS INCLUDING MATHEMATICS	PERCENTAGE
2006	1,184,223	110,417	9.32
2007	1,275,330	98,133	7.69
2008	1,369,142	188,442	13.76
2009	1,373,009	356,981	25.99
2010	1,351,557	337,071	23.36
2011	1,540,250	471,474	30.90
2012	1,672,224	649,156	38.81
2013	1,689,188	1,085,472	64.26
2014	1,692,435	982,472	58.05
2015	1,605,248	616,370	38.68

The total number of candidates is 1,575,974. It was learnt that a total of eight hundred and seventy eight thousand and forty (878,040) candidates, representing 52.97%, obtained credits in five (5) subjects and above, including English Language and Mathematics.

The Federal Government of Nigeria effort has taken some positive steps towards improving the performance of mathematics by making it a compulsory subject for primary, junior and senior secondary schools. Admission requirement to most courses in institutions of higher learning in Nigeria required at least a credit pass in Mathematics (JAMB, 2008) in Madu, (2012). A research on the factors that affects the performance of the students in mathematics is therefore, very necessary. In everything that had noted still mathematics teachers are important. They are the one that present the subject and the way it was presented, is the way that it was accepted.

If Mathematics were to be an elective subject, few students would have chosen it. Mathematics teachers have a lot to do for Mathematics to be taught and understood with simplicity. Despite the fact that Mathematics Teachers are important in teaching Mathematics, also for them to perform their duties well, instructional material are needed such as instructional technology, laboratory, concrete materials, teaching knowledge and teacher's effectiveness.

### Statement of the problem

Judging from the comment of WAEC Registrar year-in-year-out on poor performance of the students in mathematics and most especially in Geometry which has to do with solid shapes one can deduced that the learners are not actually being exposed to some of the solid shapes and mathematical tools that could assist them to learn mathematics easily. The West African Examination Council (WAEC) Chief Examiners [2003, 2004, 2005, and 2006] consistently reported candidates' lack of skill in answering almost all the questions asked in general mathematics. WAEC Chief Examiners [2003, 2005] further observed that candidates were weak in Geometry of circles and 3-dimensional shape problems. According to their reports, most candidates avoided questions on 3-dimensional shape problem, when they attempt geometry questions; only few of the candidates showed a clear understanding of the problem in their working. WAEC [2004] also reported candidates' weakness in Algebraic expression and word problems among others. Knowing fully that Mathematics Teachers cannot teach effectively without the appropriate instruments yet the stake holders do not care about instructional materials. Instructional Technology is very important for in teaching mathematics, this is one of the reasons why students don't enjoy Mathematics, due to the fact that there are all of technologies. In addition going through the mathematics curriculum the curriculum planners indicated that the learner's should be shown and thought with some tools that are

mathematical in nature and knowing fully that the said tools could assist learners in learning, understanding and be able to remembered things learned. From the above statement it cast aspersion to the mathematics teachers that they are teaching mathematics without using instructional aids and this made the subject to look like abstract to the student. This study therefore, sought to find out whether mathematics teachers are aware that there are some instruments they can use to teach mathematics. If the answer is yes, are the instruments available in various secondary schools and in what quantity? Either available in sufficient quantity or not can mathematics teachers make use of those instruments for teaching-learning process.

**Purpose of the study:** The main purpose of the study was survey of instruments needs by mathematics teachers in secondary schools in order to teach mathematics effectively, specifically the study seeks to:

- (i) identify the instructional materials needed by the mathematics teachers
- (ii) examine which of the instruments are available and in what quantity and
- (iii) highlight which of the instrument could be used by mathematics teachers during teaching learning process.

### **Research Questions**

1. Which of these instructional tools are meant for teaching mathematics?

2. Which of these mathematical tools are available in secondary school for teaching mathematics?

3. Which of these instruments could be used by the mathematics teachers for teaching mathematics?

### **Methodology**

#### ***Research Design***

This study adopted descriptive research design of survey type in order to determine the instruments needs by the mathematics teachers in secondary school. The population of the study focused on mathematics teachers in secondary school in Oyo State. The sample of the population was centred on mathematics teachers in secondary school in Ibadan metropolis of Oyo State. **Sample**

This study made use of five (5) Mathematics Teachers each in (16) sixteen public Secondary Schools in Ibadan Metropolis. The sample size used is eighty participants with fifty six male and twenty four female mathematics teachers. Sixty six of them are first degree holders and the rest fourteen are NCE holders. Simple random sampling was used in choosing the sixteen (16) Secondary schools that have five Mathematics Teachers needed for the study.

#### ***Measures***

Data were collected through the use of Questionnaire. The Questionnaire was divided into two sections: Section A consists of socio-demographic variables like age, gender, qualification, years of teaching experience and school of affiliate. Section B consists of checklists of instructional materials needed for teaching Mathematics effectively by the Mathematics Teachers. The questionnaires were taken to Secondary Schools for Mathematics Teachers to fill.

**Data Analysis:** Data collected were analysed using frequency counts and simple percentages.

#### **Results**

**RQ 1:** Which of these instructional tools are meant for teaching mathematics?

**Table 4.1: Frequency Counts showing the instructional materials that are meant to teach mathematics in Some Selected Secondary Schools by the mathematics teachers**

Instruments needed to teach Mathematics in our classrooms	Yes	No
Classroom	97.4 %	2.6 %
Laboratory	50.6 %	46.1 %
Workshop	50.5 %	49.5 %
Computers	92.8 %	7.2 %
Projector	53.4 %	46.6 %
Multimedia projectors	61.7 %	38.3 %
Work benches	50.4 %	49.6 %
Vice	52.1 %	47.9 %
Drilling machine	53.7 %	46.3 %
Drill bit (various sizes)	49.5 %	50.5 %
Hand saw (various sizes)	54.6 %	45.4 %
Solid shapes (Prisms, Cube, Cuboids, Cylinders)	97.4 %	2.6 %
Engraving machine	53.1 %	46.9 %
Cutting knives	57.7 %	42.3 %
Hammer (different sizes)	43.7 %	56.3 %
Screw drivers	65.4 %	33.6 %
Mathematical sets	97.4 %	2.6 %
Mathematical sets (black board size)	93.9 %	6.1 %
Weighing scale	92.8 %	7.2 %
Scientific calculators	90.0 %	10.0 %
Scissors (different sizes)	58.2 %	41.8 %
Pinchers (big and small)	60.7 %	39.3 %
Jack and plane	12.7 %	87.3 %
Electronic organizers	47.9 %	52.1 %
Cardboard papers	91.7 %	8.3 %
Plywood (assorted ¼, ½, ¾)	59.3 %	40.7 %
Binding wire	34.7 %	65.3 %
Glue (wood)	13.0 %	87.0 %
Gum (liquid)	47.9 %	52.1 %
Celotapes	57.1 %	42.8 %
Metal sheets	59.6 %	40.1 %
Transparences	54.6 %	45.4 %
Graph sheets	92.8 %	7.2 %
Beads (assorted sizes and colours)	89.0 %	11.0 %
Tread	57.1 %	42.8 %

The results in table 1 show that the following instructional materials are considered as mathematics tools that can be used for teaching mathematics as declared by the mathematics teachers among the selected mathematics teachers. Therefore all these instructional materials are: mathematical set blackboard type, classroom, laboratory, computers, projector, multimedia projectors, drill bit, hammer, scientific calculators, scissors, and cardboard papers. Others include weighing scale, binding wire, transparences, graph sheets and beads (assorted sizes and colours). Also, workshop, work benches, vice, drilling machine, hand saw, solid shapes, engraving machine, cutting knives, screw drivers, mathematical sets, pinchers, jack and plane, electronic organizers, plywood, gum, Celotapes, metal sheets and tread.

**RQ2:** Which of these mathematical tools are available in your school for teaching mathematics?

**Table 2: Frequency Counts showing the instructional materials that are available among the Selected Secondary Schools by the mathematics teachers**

Available Instructional material in Sampled schools for teaching Mathematics in our classrooms	Available	Not Available at all
Classroom	67%	33%
Laboratory	66%	34%
Workshop	77%	23%
Computers	70%	30%
Projector	76%	24%
Solid shapes (Prisms, Cube, Cuboids, Cylinders)	38%	62%
Mathematical sets	64%	36%
Mathematical sets (black board size)	37%	63%
Weighing scale	51%	49%
Scientific calculators	54%	46%

The results from Table2 indicate that the following mathematical instruments are available in the school surveyed in sufficient quantities. The instructional math materials that are available are: classroom, laboratory, workshop, computers, projectors, solid shapes, mathematical sets both black board size and student’s type, weighing scale and scientific calculators.

**RQ3:** Which of these instruments can be used by the mathematics teachers for teaching mathematics?

**Table3: Frequency Counts Showing the Instruments that can be used effectively by Mathematics Teachers in**

**Teaching Mathematics**

Instruments that can be used effectively by the Mathematics teacher to teach in the classrooms	Yes	No
Laboratory	56%	44%
Computers	48%	52%
Mathematical sets(student’s type)	51%	49%
Mathematical sets (black board size)	46%	54%
Weighing scale	40%	60%
Scientific calculators	60%	40%
Graph sheets	66%	34%
Beads (assorted sizes and colours)	62%	38%

The results from Table 3 showed the available instructional materials that mathematics teachers can use effectively in teaching-learning process of mathematics as follows: laboratory, computers and mathematical sets, weighing scale, scientific calculators, graph sheets and assorted beads.

**DISCUSSION**

The response to research question one indicated that the following instruments are meant for teaching mathematics as declared by the mathematics teachers used for the study and also in line with recommendation of mathematics curriculum planner. The instructional materials among others workshop, work benches, vice, drilling machine, hand saw, solid shapes, engraving machine, cutting knives, screw drivers, mathematical sets, pinchers, jack and plane, electronic organizers, plywood, gum, Celotapes, metal sheets and tread. The result implies that if these Mathematical instruments are available and adequate in schools it will go a long way to improve performance in mathematics if the mathematics teachers make use of these instruments as expected.

The answer to research question two indicates that the following mathematical instruments are available in the school surveyed in sufficient quantities. Among the instructional materials that are available are classroom, laboratory, workshop, computers, projectors, solid shapes, mathematical sets both black board size and student’s type, weighing scale and scientific

calculators. This result indicated that just very few instructional materials are available in the schools sampled. This is an indication that mathematics teachers are teaching mathematics without any instructional materials. Only nine instructional materials are available out of almost thirty-five instructional materials recommended by mathematics curriculum planners. This is far from being satisfactory as this is an indication that much is not done as far as provision of mathematics instructional is concern. The findings of this second research question is line with findings of Stephen (2009) who described mathematics as the mother of all sciences and that diverse phenomenon in physical, biological and economic situations can be communicated through the concept of shape, quantity, size and order. This statement further indicated that instructional cannot be joke with in teaching mathematics if desirable performance is required.

The results from Table 3 showed the available instructional materials that mathematics teachers can use effectively in teaching-learning process of mathematics are as follows: laboratory, computers and mathematical sets, weighing scale, scientific calculators, graph sheets and assorted beads. When one consider the number of instructional materials that are listed for the teaching of mathematic one would see that the number available is very negligible and when compared to those that can be used by the mathematics teachers one would see that there is nothing to write home about the level of expertise of the mathematics teachers that are teaching secondary mathematics. Without any prejudice one can conclude that teaching mathematics without instructional materials lead to poor perforce in the subject and in particular in the area of Geometry. Because without students knowing how the shape of objects they are studying look like it will be very difficult for them to work on imagination. This finding corroborated the comment of Chief Examiners [2003, 2004, 2005, and 2006] who consistently reported candidates' lack of skill in answering almost all the questions asked in general mathematics. WAEC Chief Examiners [2003, 2005] further observed that candidates were weak in Geometry of circles and 3-dimensional shape problems. According to their reports, most candidates avoided questions on 3-dimensional shape problem, when they attempt geometry questions; only few of the candidates showed a clear understanding of the problem in their working.

### **Conclusion**

Based on the above findings the researcher concluded that the following are instructional materials needed to be used in teaching mathematics, viz: workshop, work benches, vice, drilling machine, hand saw, solid shapes, engraving machine, cutting knives, screw drivers, mathematical sets, pinchers, jack and plane, electronic organizers, plywood, gum, Celotapes, metal sheets and tread, weighing scale, assorted beads, electronic calculator, blackboard, computers, electricity supply, solid shapes, projectors etc. Also, those instructional materials in sampled school are grossly inadequate and that mathematics teachers do not use instruction materials to teach.

### **Recommendations**

Based on the findings of this study researcher hereby made the following recommendations that

(i) Only trained mathematics teachers should be allowed to teach Mathematics in various secondary schools regardless of the location and size of the school for effective teaching of the subject. (ii) The education stakeholders should make it compulsory that all Secondary School must be provided with mathematics instructional materials and must be utilized in all mathematics lessons. (iii) Education stake holders should plan seminars, workshops and in-service training or refreshers course for mathematics teachers to keep them update on how to use instructional material when teaching for effective and to enhance high academic performance in the subject.



## REFERENCES

- Abiodun, J. F. 2007. Computer-assisted cooperative learning in integrated classrooms for students with and without disabilities. *Information Technology in Childhood Education*.
- Aduda, D. (2003, February 27). Kenya Certificate of Secondary Education, Examination Results Released by Minister of Education. *Daily Nation*, Nairobi: Nation Media Group Ltd.
- Amazigo JC.(2000): Mathematics Phobia Diagnosis and Prescription. *National Mathematical Centre First Annual Lecture, Abuja*, July.
- Fasasi, K.M (2009). Institutional impediments associated with students failure in mathematics in secondary schools in Adamawa state. *Journal of education studies 14(1)* 92-98.
- Madu, H. 2012. Using large-scale research to gauge the impact of instructional practices on student reading comprehension: An exploratory study. *Education Policy Analysis Archives, 11(19)*: 1-19.
- Obioma GO (2005) Emerging issues in mathematics education in Nigeria with emphasis on the strategies for effective teaching and learning of word problems and algebraic expression. *Journal of issues Math. 8 (1), A Publication of the Mathematics Panel of the STAN*, 1-8.
- Obodo,G.C (2001).Promoting mathematics teaching and learning in schools An essential factor for universal basic education in Nigeria. "Proceedings at the annual conference of mathematics association of Nigeria" Abuja.
- Odumosu, M.O, Oluwayemi, M.O, & Olatunde, T.O (2012). Mathematics as a tool in Technological acquisition and Economical Development in transforming Nigeria to attain vision 20; 20; 20 A proceeding of Mathematical Association of Nigeria (MAN) Annual National Conference, 199-207.
- Okereke, R. A (2006). Teaching of mathematics in schools. The laboratory Approach. *The Nigeria Teacher Today, 8 (1,2)*: 180-184.
- Sam, J. 2006.. Manipulatives in Mathematics Instruction. *Master's Thesis, Unpublished*. Bemidji, MN: Bemidji State University.
- Stephen, T.K (2009). The Role of Mathematics as a foundation for Education of Children in Science and Technology in the Universal Basic Education (UBE). *Journal of Educational Studies 14(1)* 146 – 151.
- Useni, A. C. 2012. Students' perceptions of agric-science when taught through inquiry-based instruction. *Journal of Agricultural Education, 55(1)*: 66-75.