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## EMPLOYING INQUIRY-BASED METHOD OF TEACHING IN MATHEMATICS FOR SOCIO-POLITICAL RECONSTRUCTING OF NIGERIA

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### ABSTRACT

This study investigated the effects of inquiry teaching strategy on academic performance of senior secondary school mathematics students in Ondo West Local Government area, Ondo State. The study adopted pre-test, post-test, quasi-experimental control. A simple random sampling technique was used to select one hundred (100) senior secondary schools students in two schools. Two hypotheses were tested at 0.05 level of significance. The instrument used in gathering data for the study was mathematic Achievement Test (MAT). Data collected was analyzed using sample t-test. The results of study showed that inquiry-based method enhanced students academic performance in mathematics. The result also indicated that Male. Mathematics students, taught with inquiry based method performed better than their female counterparts taught with traditional method. The findings of the study also revealed that there was no significant difference in the academic performance of male and female students exposed to inquiry-based method. It is therefore recommended that mathematics teachers should be encouraged to teach the students using inquiry based method.



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## Introduction

The contribution which the knowledge of mathematics has made to economic, industrial and technological growth of modern world is quite obvious to everyone. The discoveries such development of supersonic flights, the invention and launching of satellites depends largely on the application of calculus, an aspect of Mathematics it is not surprising therefore to observe that a background in Mathematics is crucial for many career and job opportunities. Mathematics is a fundamental science, which is necessary for the understanding of most other fields. Awolola (2003) Asserts that no binding forces among the various branches of science, Physical, Biological and Social is as Mathematics. He added, The Knowledge of science remains superficial without mathematics.

The teaching methods and lack of in service training is one of the major challenges in Nigeria's education. Mathematics which appears to be the base of all science subject demands a systematic and interesting method (s) that will attract both teachers and students. it is therefore, implies that the old teacher center method may not be able to meet the needs of the 21st century teaching/learning process.

However, there is a need for the use of inquiry-based teaching method that will not only maximize meaningful understanding of concepts in mathematics but will provide students the opportunity to improve Socio-economic and political issues in Nigeria.

This will borders on eradication of poverty and human development. In support of enhancement of socio-economic and political reconstruction for 21st century, the millennium Development Goals (MDGS) (Egbule, 2004) stipulates eradicating poverty and hunger promoting gender equity and empowerment of working ensuring environmental sustainability and development of global partnership with other countries of the world as ways of peaceful co-existence in African continent. One way of achieving the audable goals could be to improve the methods of teaching and learning of Mathematics which appears to be the base of all science subjects.

Inquiry teaching method is a style or method of teaching where the learner is seeking to discover and create answers to recognized problems through procedure of making diligent search, sometime with minimum guidance of from the teacher (calson, 2003)

Science and mathematics process skill are based on scientific inquiry and teaching mathematics by inquiry involves teaching students mathematics process skills, critical thinking, scientific reasoning skills used by scientists (Pratt and Itackett, 2008) and inquiry is defined as an approach to teaching mathematics. In inquiry teaching strategy, the students are provided with opportunities to discover new truths, new rules, and new method of tackling problems as well as new values for themselves (Esan 1995). Though, this may be very difficult and it is time consuming. There will be joy of discovery things for themselves on the part of students. this method is good for any aspect of learning especially when we use discovery or inquiry method to mean finding out. Inquiring method involve students studying certain topics comprehensively.

According to Algonian and Iyanic (2001), inquiry strategy is a process through which learners are provide with opportunities to discover new truths, new rules and new method of tackling a problem as well as new values for themselves. Instead of giving them information, the teacher allows the students to and out information themselves. According to Afolabi (2012) and Akinbobola (2004) inquiry method are interactive, democratic and learner central, the teacher role is to serve as Many research works have been carried out in mathematics and sciences on the effectiveness of inquiry based method of teaching. Popoola (2003) found students who were taught mathematics

concepts using inquiry method to outperform students in conventional class. Obeka (2010) found that inquiry had significant effects on students over all achievement in geography similarly, seweje (2004), Oloyede (2010), Igbo egwu (2012) in these research found that inquiry-based method is powerful in improving students performance in chemistry compared to those taught using the conventional methods also, Ibrahim (2009) and Nwagbu (2010) also found inquiry teaching methods to have positive effects on students performance in their researches.

Lyang (2001) opined that to successfully adopt the inquiry approach, students must perform certain mental process such as observing, classifying, measuring predicting inferring and hypothesizing. As such a lot of inquiry prevails in the classroom with the teacher acting as a motivator, getting from point to point to guide the learning pupils and helping them overcome difficulties. The teacher performs the duty of a resources person who guides the learner sources of information inquiry learning is crucial for developing critical-thinking skills, scientific, mathematical problem solving and developing scientific content knowledge

### **Statement of the Problem**

The problem of poor achievements of students in mathematics is of great concern to mathematics educators and relevant stake holders in education. Reasons given by some stakeholders of education are unstable method and techniques used by teachers to teach the subject which seem to have resulted into under-achieve lack of interest, poor attitude of students towards the subjects. Most of the teachers are using conventional method to teach mathematics which seems not to keep the students to understand the various mathematical concepts and develop their analytical reasoning (Stison 2004).

The issue of an alternative to conventional method poses problem to educational research. Hence the following general questions were raised:

1. What are the effects of inquiry based method on students performance
2. Will gender influence students performance
3. Research Hypotheses
4. Ho1: There is no significant difference in the academic performance of students taught using conventional
5. Ho: there is no significant difference in the performance of male and female students taught using inquiry based teaching method

### **Methodology**

The mathematics Achievement Test (MAT) was initially administered to the treatment groups as pretest and the scores were used as a covariate measures in order to account for possible pre-existing differences in the overall ability between the treatment groups.

### **The Mathematics Population**

All senior secondary school two (SSII) mathematics students in all Twelve (12) co-educational secondary school in Ondo West Local Government Area of Ondo State in Nigeria formed the population of the study. The size of the population was 680 senior secondary school two (SSII) mathematics students.

Sample and Sampling technique 100 mathematics students were used for the study. This comprised of 54 male and 46 female students and random sampling techniques was used to select school from the target population.

**Instrument and Validation**

The instrument used to measure students achievement was developed by two mathematics teachers and the validity was as curtained by mathematics educator expert.

Each instrument was a 50-multiple choice items constructed on the topics. The instrument was pilot tested to establish reliability. Kuder-Richonds on formula 21 was used to obtain reliability coefficient of the instrument. The coefficient of internal consistency of the Mathematics of internal consistency of the mathematics Achievement Test (MAT) was 0.80

**Research Method**

A non-randomised pretest-posttest control group in guasi-experimental design was adopted for the study. Mathematics Achievement Test (MAT) was the instrument wed to gather data for this study. A total of fifty (50) multiple choice items were constructed on indices logarithms and surds by the researcher. Each item had four options with only one.

One intact class was randomly selected from each school used for the study. One of the intact class was taught the concept of indices, logarithms and surds using inquiring based teaching method while the other intact class was taught the contents of indices, logarithm and Surds using the conventional teaching strategy.

**Research Hypothesis one**

There is no difference in the achievement of senior school students taught mathematics using inquiry-based teaching approach and those taught using conventional teaching strategies.

**Table 1:** Independent samples t-test of the students taught mathematics using inquiry-based teaching strategy and those in control group

Variables	N	X	S.D	Df	t-cal	t-tab	Level of Significance	Decision
Inquiry Method	50	72.36	58.12	98	4.31	2.18	0.05	Rejected
	27.64	44.29						

Table 1 above shows that there is significant difference in Mathematics academic performance between students taught using inquiry teaching method (and those taught using conventional lecture method. This shows that performance of students in Mathematics is determined by the teaching method used by the teachers since t-cal which is (4.31) is greater than the t-tab (2.18) with degree of freedom of 98 at 0.05 level of significance

Hypothesis 2: There is no significant difference in the mean scores of male students taught using inquiry teaching strategy and female students taught mathematics using convention method.

t-test analysis of post-test scores of male and female students exposed to inquiry-based teaching method and conventional method

Variable	N	X	S.D	Df	t-cal	t-tab	Level of sig	Decision
Inquiry Based	50	68	70.4	98	3.08	2.18	0.05	Rejected
Conventional Method	50	32	70					

Table 2 above shows that there is significant difference in the means score of male students taught using inquiry-based taught mathematics using conventional method. This shows that the teaching method by the mathematics teacher determines students academic performance in that inquiry method students to be inquisitive instead of depending on what the teacher is able to explain using limited instructional materials. T-cal which is 3.08 is greater than the t-table 2.16 with degree of freedom of 98 at 0.05 significant

### Discussion

The result of the study showed that there was statistically significant difference in the achievement of students taught indices, logarithms and Surds using inquiry-based teaching strategy compared with their counterparts in the control group.

The result of this study indicated that inquiry-based teaching strategy improved the achievement of students's in mathematics. This was in agreement with stilson (2004) who found out that inquiry teaching strategy had some effects on students academic performance. The improvement in achievement could be due to the fact that students were actively involved in the teaching and learning process. The findings was also in agreement with Afolabi & Akinbobola (2009) and Odutuyi (2012) who found out that treatment had no positive effect on mathematics performance based on gender.

### Conclusion

Inquiry-based teaching strategy had significant effect on students achievement. The findings of this study revealed that the use of inquiry-based teaching strategy in the teaching and learning process enhanced students achievement in mathematics significantly. Based on the findings of the study it could be concluded that most mathematics teachers in secondary schools in Nigeria and Ondo State in particular lack staff development programme for training on means of enhancing socio-economic and political reconstruction in the state.

### Recommendations

Based on the findings of this study, the following recommendations were considered appropriate

1. Inquiry-based teaching strategy is also an effective instructional strategy therefore its use should be encouraged for teaching and learning mathematics at the senior secondary school level of education.
2. The government can render assistance in the area of socio-economic and political reconstruction by adequately funding mathematics teachers education programmes that will be fully involve in teaching students with innovative method
3. Teachers' emphasis should shift from teacher centred approach of teaching to more activity-based learning such as inquiry based teaching strategy.

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