EFFECT OF CONCEPT OF INDICES ON THE PROBLEM SOLVING ABILITY OF MATHEMATICS STUDENTS IN LOGARITHM

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Abstract

This study investigated the effects of concept of indices on the problem solving ability of mathematics students in logarithm . the study was designed to find out the effect of concept of indices on the problem solving ability of mathematics students in logarithm. The study made use of 200 senior secondary school three (3) students drawn from five secondary school in Ikere Local Government Area of Ekiti State by using multistage sampling technique. The students were grouped into two: Group A for the control group that will be taught indices only during instruction, while group B will be the experimental group that will be taught both indices and Logarithm together during instruction. Achievement Test (AT) was the instrument used. The achievement Tests was aimed at testing the ability of students in solving problems in indices and logarithms. Three hypotheses was tested at 0.06 level.

Keyword: Concepts, Indices, Problem, Solving ability and Logarithm

Introduction

In spite of the importance and usefulness of mathematics, secondary school students achievement in the subjects is very discouraging. The poor performance trend is indeed worrisome as seen from the works of (Anaduaka and Okafor 2013) and (Olosunde and Akinpelu 2013). The importance of mathematics in man's activities cannot be overemphasized. This is because mathematics is one school subject that is integral part of everyone's life and affect virtually every field of human endeavour. Many researchers have blamed the poor achievement in mathematics on the use of inappropriate teaching strategies which might lead to lack of interest and retention of mathematical concepts, (Agommuch and Ifeanacho 2013). Under a condition where students

are taught with inappropriate teaching strategy, they are not likely to acquire needed knowledge and skills for science, technology and engineering advancement. Salman (2005) defined mathematics as a precursor of scientific discoveries and inventions. In this scientific age, the impact of mathematic is virtually seen in all fields of study as well as in all human (endeavours. Awofala 2012) said that mathematics is the backbone of technological breakthrough (Chinweoke 2015) emphasized that importance of mathematics in the scientific, technological and economic development of any nation has made its teaching and learning in secondary schools very important .(Elekwa 2010) remarked that students exhibit non-chalant attitude towards mathematics, even when they know that they need it to forge ahead in their studies and in life.

Relationship Between Indices and Logarithm

Indices and logarithm are closely related to each other. Their difference lies in the way they are presented or their format.

Indices format: $a^x = y$

Logarithm format: $\log_a y = x$

Which format to use depends on the initial mathematics problem or questions given and what is the unknown to be solved.

(MAN 1991) also stated that logarithm is the inverse operation of indices. Aaccording to (MAN) any number can be expressed as power of other member, Hence, logarithm of a member to a given base is the index to which the base must be raised so that it is equal to the given base.

Research Hypotheses

The following will hypotheses were formulated

i. Ho_1: There is no significant difference in the performance of the control group and the experimental group in problem solving in logarithms before instruction.

ii. Ho_2: There is no significant difference in the performance of male and female in solving logarithm problems.

iii. Ho_3: There is no significant difference in the performance of those taught logarithms in solving problem in logarithms, posttest.

Methodology

This study was designed to find out the effect of concept of indices on the problem solving ability of mathematics students in logarithm. The study made use of 200 senior secondary school three (SSS3) students (100 males and 100 females) from five secondary schools in Ikere Local Government Area of Ekiti State by using multistage sampling technique. This same method was used in selecting the students and also grouping them into two groups: Group A: This is the control group, the group that will be taught indices only during instruction. Group B: This is the experimental group, the group that will be taught both indices and logarithm together during instruction. The instrument used is achievement test. The achievement test is administer as following pre-test and posttest. The achievement test was aimed at testing the ability, of students in solving problems in indices and logarithms. The test is divided into two section, the section A was objectives while section B was essay.

Validity of the Instrument
The test items were given to five experts in Mathematics Department to comment whether the items came within or outside the syllabus meant for senior secondary school class.

Purpose of the Study
The purpose of this study was to investigate the effect of concept of indices on the problem solving ability of mathematics students in logarithm.

Procedures for Data Collection
The researchers went to the selected schools informing the school authority and the students the purpose of their researcher. They then sought the assistant of the mathematics selected schools through teachers in each of the selected school throughout the research work. The period of the study lapsed for two weeks. The selected students were grouped into Group A that is the control group, those students that will be taught logarithms only during instructions. Group B is the experimental group, those students that will be taught both indices and logarithms together during instruction. At the end of the instruction in the second week, the same Achievement Test (AT) used as pre-test was administered as posttest to both groups under normal and fair examinations condition with the assistance of mathematics teachers in each of the schools.

Results

In testing the three hypotheses, the result were analysed using t-test, and this is done by calculating the mean scores (X) and the standard deviations of the students in both the control group and experimental group respectively. The computed values are shown below:

Table 1: Mean scores and standard deviation of Groups A and B, those taught indices only and those taught logarithms and indices.

Group	X	SD	N	df	Tc	Tb	Result
A	13.1	5.59	100	198	0.13	1.96	Not significant
B	13.0	5.65	100				

The table 1 above showed that the t-calculated is 0.23 while the t-tabulated was 1.96. This showed that there was no significant difference in the performance of those taught logarithms and those taught logarithms and indices.

Table 2: Mean scores and standard deviation of male and female

Group	X	SD	N	df	Tc	Tb	Result
Male	26.5	10.2	100	198	2.65	1.96	Significant at 0.5 level
Female	22.2	12.6	100	198			

Table 2 above shows that t-calculated is 2.65 at the t-tabulated is 1.96. There is a significant differences in the mean performance of the male and female.

Table 3

Group	X	SD	N	df	Tc	Tb	Result
A	18.1	11.20	100	198	11.20	1.96	Significant at 0.05 level
B	30.7	2.3	100				

From the table above, there is a significant difference between the two groups. These shows that the performance of those with and these without the knowledge of the basic concepts of indices differ in problem solving in logarithms after instruction.

Discussion of Finding

On the three hypotheses tested by the researchers. The test carried on hypothesis one confirmed that there was no significant difference in the ability of the students under investigations in problem solving in logarithms. The result indicted that both the control group and the experimental group were of equivalent performance/ability in problem solving in logarithms.

The second hypothesis which states that there will be no significant differences in the performance of male and female in solving logarithms problem was rejected by the findings.

The third hypothesis states that, there will be a significant difference in the performance of students without and those with the knowledge of basic concepts of indices in solving problems in logarithms was rejected. There was a significant difference between them in term of ability and achievement.

Conclusion

In the light of the outcome of the null hypothesis tested, the differences in the performance of these with Group B and those without Group A, the knowledge of basic concepts of indices is solving problems in logarithms is due to previously learned concepts if indices before subjecting them to problems solving in logarithms.

Recommendations

Based on the findings and conclusion, it is recommended that, teachers should find a way of making mathematics interesting and curiosity in students by making them to understand both the topic and the concepts that the pre-requisite to those concepts. Every possible reinforcements (such as scholarship) should be used so that students can be motivated to learn mathematics with understanding.

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