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Effects of Formative Assessment and Guidance Counseling Strategy on Mathematics Achievement of Junior Secondary Schools Students in Nasarawa Eggon LGA of Nasarawa State, Nigeria

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Abstract

This study investigated effects of formative assessment and guidance counseling strategy on Mathematics achievement of junior secondary school students in Nasarawa Eggon LGA of Nasarawa State, Nigeria Two research questions and two null hypotheses guided the study, and a quasi-experimental research design involving pre-test, post-test control group was employed. The population for the study consisted of all 5,343 JSS II students that offered Mathematics 2021/2022 academic season and 125 students were used as sample size of the study through random sample technique. 40 multiple-choice items entitled ''Mathematics Achievement Test'' (MAT) and Mathematics Interest Inventory were used as an instruments for data collection. MAT and MII were validated and yielded a 0.88 and 0.78 validity indexes, and the KR-**21** statistics was used to determine the reliability of internal consistency of MAT which yielded a 0.86 reliability index and 0.76 reliability index for MII through Cronbach Alpha statistics. Mean was used to answered the research questions while ANCOVA was used to test hypotheses at the 0.05 level of significance. The findings of this study revealed

that, there was a statistically significant difference in the mean achievement scores of students taught Mathematics using FAS, GCS and those in CTM and there was a statistically significant difference in the mean interest scores of students taught Mathematics using FAS, GCS and those in CTM. Based on the findings of this study, the following recommendations were raised: Nasarawa State Ministry of Education should formulate policies that will mandate Mathematics teachers to use formative assessment strategy (FAS) and guidance counseling strategy (GCS) to enhance students' interest and academic achievement in teaching Mathematics and organize workshop/seminar to educate Mathematics teachers on how to use teaching strategies.

Keywords: Formative Assessment, Guidance Counseling, Mathematics, Achievement, Interest

Introduction

At all the levels of education, educational measurement, evaluation and assessment plays significant role in quantifying learners behaviors, value categorically, technically its answered the question thus ''**how much**, and **how well''** an individual learner achievement/ performed after a specified educational task accordingly (Galle, 2021). The process of assigning symbols to the dimension of phenomenon in order to characterize the status of phenomenon as precisely as possible which is known as Measurement. And assessment it is the practical application of measurement and just as all testing could be subsumed under assessment, so could all assessment be subsumed under measurement (Galle, Yakubu, & Abimiku, 2022). It involves collecting data with a view to making value judgment about the quality of a person, object, group or event (Galle, Sakks, & Aminu, 2018). Assessment practices provide the ways to measure individual and institutional success, and so can have a profound driving influence on systems they were designed to serve.

To relates the variables of the study judiciously, Formative Assessment Strategy (FAS) to involves a continuous way of checks and balances in the teaching learning processes, allows teachers to frequently check their learners' progress and the effectiveness of their own practice by allowing self-assessment of the student (Hannah, George, Elizabeth, Kirsteen, & Ruochen, as cited in Galle, Ezeofor, & Ofomata, 2022). Practice in a classroom is formative to the extent that evidence about student achievement is elicited,

interpreted, and used by teachers, students, or their peers, to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions they would have taken in the absence of the evidence that was elicited (Black, & Wiliam, 2019). FAS help in-process feedback about what students are or are not learning so instructional approaches, teaching materials, and academic support can be modified to the students' needs. Because of the additional data students and teachers are better equipped to understand the gap in learning and try new ways of learning prior to a high stakes traditional assessment where teachers often move on from previous topics and continue with new material.

Consequently, **Guidance Counseling Strategy (GCS)**, refers to the process of helping individuals discover and develop their educational, vocational, and psychological potentialities and thereby to achieve an optimal level of personal happiness and social usefulness (Raymond, Rashford & Williams, 2016). The terms are further discussed separately thus: Counseling is essentially democratic in that the assumptions underlying its theory and practice are, first, that each individual has the right to shape his own destiny and, second, that the relatively mature and experienced members of the community are responsible for ensuring that each person's choice shall serve both his own interests and those of society. It is implicit in the philosophy of counseling that these objectives are complementary rather than conflicting. The function of those who guide children and young people is not to effect a compromise between the requirements of individuals on the one hand and the demands of the community on the other (Raymond et'al 2016). It is rather to orient the individual toward those opportunities afforded by his environment that can best guarantee the fulfillment of his personal needs and aspiration.

Guidance, in this sense, is a pervasive activity in which many persons and organizations take part. It is afforded to individuals by their parents, relatives, and friends and by the community at large through various educational, industrial, social, religious, and political agencies and, particularly, through the press and broadcasting services (Raymond et'al 2016). A part of such guidance may be the giving of information that enables others to increase the scope of their exploratory behaviour. The guidance counselor/teacher, for example, may provide information about a student's/person's own abilities and interests as determined by psychological tests or about educational opportunities and the requirements of various occupations. The competent counselor does not attempt to solve people's problems for them, however; the counselor tries instead to clarify the person's own thinking toward his/her academic achievement. According to according to Galle (2021) describes academic achievement as the ability of student to function effectively, respond quickly or perfectly to a given task.

Achievement describes the level of success in relation to a task that is carried out using a standardized test under planning instruction (Galle; Sabo & Kwoku, 2022). For a learning teaching to be achieved under the auspices of a classroom teacher in respective of teaching strategy, students interest is very paramount. Interest, has been variously defined as a kind of consciousness accompanying and stimulating attention, a feeling, pleasant or painful directing attention, the pleasurable or painful aspect of a process of attention, and as identical with attention of itself (Mohammed, 2017). Interest is defined and whether it is described as a cause of attention, an aspect of attention or as identical with attention, its' special significance lies in its intimate connection with the mental activity or attention. Interest is the focusing of the sense organs on or giving attention to some person, activity, situation or object. Interest is a motivating factor in teaching and learning process hence it influences learners' academic achievement and retentive power (Galle; Sabo & Kwoku, 2022), and conventional teaching method is also a determine factor student's achievement in Mathematics.

Conventional Teaching Methods (CTM) also be deemed restricted to some degree. Traditionally, classroom settings are teacher-centred where the teacher often talks at the students instead of encouraging them to interact, ask questions or make them understand and retained the concept thought in the lesson (Galle, 2021). Most classes in Nasarawa state junior secondary schools involve rote learning of Economics, where students depend on memorization without having a complete understanding of the subject. Just bypassing the tests, consisting of descriptions, matching and other forms of indicators are all that matter to complete the mathematics curriculum. Too much talking during teaching period and dictations, rote memorization and little interaction in the classroom often leave students less attentive and less engaged and prone to skipping classes and missing lessons altogether. Moreover, students in a traditional class have little opportunity to interact with their classmates or their teacher which resulted to poor achievement in Basic Education Certificate Examination (BECE) Mathematics Junior School Certificate Examination (JSCE). The BECE/JSCE, Mathematics 2019-2022 shows in 2019, 1,567,16 candidates registered and sat for the examination, 33.7 % passed while 66.3% failed. 2020, 2,467,11 candidates registered and sat for the examination, 43.7 %) passed while 56.3% failed. 2021, 2,669,14 candidates registered and sat for the examination, 48.2 %) passed while 52.8% failed and in 2022, 3,97,19 candidates registered and sat for the examination, 49.1 %) passed while 51.9% failed (NBECE, 2019-2022 -Nasarawa State Ministry of education, 2022) Furthermore, several literatures reviews were scholarly discussed such as Galle, Ezeofor and Ofomata (2022) findings revealed that students taught Mathematics using formative assessment with big data analytics achievement higher than their counterpart students in conventional group and male and female students taught Mathematics

using formative assessment with big data analytics achievement higher than their counterpart students in conventional group. Galle, Sabo and Kwoku (2022) finding revealed that, there is significant difference in the achievement mean scores of students taught Social Studies using peer assessment strategy (PAS), using Model and those taught using conventional teaching method (CTM) and there is significant difference between the interest mean scores of students taught social studies using PAS, model and CTM. Also, Galle (2021) finding reveals that the use of CAI-course-lab 2.4 is more effective in enhancing students' achievement and interest in Economics than conventional instructional teaching method and, Ugodulunwa, and Anikweze (2019) findings revealed that formative assessment lead to increase positive attitude and improved Social Studies achievement of the students, and Galle and Kukwi (2020) finding also revealed that formative assessment reduced anxiety level and significantly increased econometrics academic achievement of the male and female students.

Statement of the Problem

In Nigeria, teaching Mathematics in Junior Secondary Schools generally appears to be through conventional teaching method (CTM), notes giving and taking, chalkboard illustrations, demonstrations and other teacher-centered methods which enable students to only form mental models of concepts presented to them thereby resulted to poor achievement in JSCE. For instance, BECE 2019-2022 revealed 45-48% passed while 52-56% failed. This may have occurred as result CTM leading to loss of interest in learning as students tend to forget what they learn easily due to perceived nature of Mathematics makes students turn away from or avoid the subject, in most cases, they see Mathematics as a difficult subject. Hence, the researchers compared used of FAS, GCS and CTM to explored JSS II Mathematics achievement using interest as moderator variable in Nasarawa Eggon LGA of Nasarawa State, Nigeria.

Research Questions

The following research questions guided the study.

RQ1: Is there any statistical significant difference in the achievement mean scores of students taught Mathematics using FAS, GCS and those in CTM in Nasarawa Eggon LGA of Nasarawa State, Nigeria?

RQ2: Is there any statistical significant difference in the interest mean scores of students taught Mathematics using FAS, GCS and those in CTM in Nasarawa Eggon LGA of Nasarawa State, Nigeria?

Hypotheses

The following null hypotheses raised and were tested at 0.05 level of significant.

Ho1: There is no statistical significant difference in the achievement mean scores of students taught Mathematics using FAS, GCS and those in CTM in Nasarawa Eggon LGA of Nasarawa State, Nigeria

Ho2: There is no statistical significant difference in the interest mean scores of students taught Mathematics using FAS, GCS and those in CTM in Nasarawa Eggon LGA of Nasarawa State, Nigeria

MATERIAL AND METHODS DESIGN

Design

The study adopted quasi-experimental design, involved non-randomized pretest-posttest control group. The choice of this design and its significance to this study was considered suitable and non-equivalent constitute the three groups that were used for this study. The study comprised two experimental groups (A&B) and one conventional group C. The selection was done based on three junior secondary school students. The JSS II students that were taught on content/topics are: simple equations, linear inequalities, linear inequality (graphical representation) and graphs of linear equations selected from the junior secondary education curriculum for JSS II. The testing procedures were the same within the three groups. The design is symbolically represented in fig1.

Fig 1: Illustration of the Design of the Study

Groups	Achievement			Interest		
Experimental Group A: FAS	0_1	X_1	0_2	0_3	X_1	0_4
Experimental Group B: GCS	0_1	X_2	0_2	0_3	X_2	0_4
Control Group C: CTM	0_1	-	0_2	0_3	-	0_4

Where:

0_1 = Pretest with MAT

0_2 = Post-test with MAT

X_1 = Treatment :FAS

X_2 = Treatment: GCS

- = Control: CTM

0_3 = Pretest with MII

0_4 = Post-test with MII

The experimental group A students were exposed to the used of FAS, experimental group B students were exposed to the used of GCS, while the control group C students were was exposed to the use of CTM. This strategy, according to Steckelberg and Srinivasan (2008) allows the researchers not only to control the effects of the

independent moderator variable but also to determine any differences that may be attributed to them in the study. Below is the operational chart contained 40 Items Mathematics Achievement Test (MAT).

Table 1: operational chart contained 40 Items Mathematics Achievement Test (MAT) for JSS II Students

Content Area	Time(Hrs)	Know 45%	Comp 35%	App 20%	Items
simple equations	2	**5**(1, 2, 3, 4, 5)	**3** (7, 9, 10)	**2** (6, 8)	10
linear inequalities,	2	**5**(11,13,14,15, 19)	**3**(12, 16, 20)	**2** (17,18)	10
graphical representation	2	**4**(21,24,25, 27)	**4**(22, 23, 28, 29)	**2**(26,30)	10
graphs of linear equations	2	**4**(31, 32, 33, 39)	**4**(34,35, 37, 38)	**2** (36, 40)	10
Total Items	**8**	**18**	**14**	**8**	**40**

Population and Sample

The population for the study consisted of all 5,343 junior secondary school two students (JSS II) that offered Mathematics in Nasarawa LGA of Nasarawa State, Nigeria 2021/2022 academic season. A simple 125 JSS II Mathematics students from three schools in Nasarawa LGA of Nasarawa State were selected through random sample technique. Before obtaining the sampled size, lottery method of simple random sampling was employed to selected sample three schools namely: Government Secondary School Galle 41 students were exposed to FAS (Experimental Group A), Government Secondary School, Alogani 41 students were exposed to GCS (Experimental Group B) and Government Secondary School Nasarawa Eggon 43 students were exposed to CTM (Control Group C). Serial numbers of the elements on pieces of papers folded and mixed thoroughly before respondents were asked to picked at once without replacement. This technique gave equal opportunity to the respondents thereby reducing the bias effects that may interfere with the validity and reliability of this study.

Instrument for Data Collection

For the purpose of the study, the researchers developed two instruments namely; Mathematics Achievement Test (MAT) and Mathematics Interest Inventory (MII).

MAT was used as an instrument for data collection. The researchers developed the items after the Item Analysis (IA) of the Multiple Choice Questions prepared for JSS II Mathematics students. According to the IA, questions with a degree of discrimination of more than 0.30 were selected in such a way that they would not prejudice the validity of the test. A 40 items multiple choice questions contained in the MAT. The construction of MAT was based on four topics (family, marriage, drug abuse and drug trafficking). MII was used for collection of pretest interest scores and posttest interest scores. The MII was made up of sections "A" containing bio-data of the respondents and "B" that contained a 20-item interest inventory developed by the researcher. It was constructed by generating a list of statements to show the extents of students' interest in Social Studies and providing a set of graduated response options. The response options consisted of a 5-point rating scale, ranging from like very much to dislike very much. The scale and the scoring guide were; Like very much = 5, Like = 4, Neutral = 3, Dislike = 2, Dislike very much = 1. The items with negative questions were scored in reverse form.

Validity and Reliability of Instrument

MAT and MII were subjected for face and content validation. Two experts, who are knowledgeable in the skills being measured in Mathematics Education department and Educational Measurement and Evolution in Nasarawa state University keffi, by checking for appropriateness, comprehensiveness and relevance of the items, clarity of expression and size of print. Items that did not measure what they ought to measure were deleted or modified, while good items were retained. The experts verified if the items were in line with the content and objectives stated in the curriculum. The consensus of the expert's judgment rating for MAT yielded 0.87 and MII 0.86 validity indexes. The KR_{-21} statistics was used to determined reliability of the internal consistency of the MAT and MII. Pilot study was conducted on small portion of the population who are not part of the sample of this study, result for MAT gave 0.85 and MII 0.84 reliability indexes. The reliability results of MAT and SOSII were compared with the guidelines for interpreting alpha coefficients suggested Ugunduluwa and Okolo (2015) that "$\alpha \geq$ 0.9 excellent, $\geq$ 0.8 good, $\geq$ 0.7 acceptable, $\geq$ 0.6 questionable, $\geq$ 0.5 poor, $\leq$ 0.5unacceptable". Therefore, the results of the reliability enabled the researchers to use the instrument for both pretest and posttest, since the correlation was considered high and significant.

Procedure for Data Collection

Three research assistants were trained by the researchers to assist in administering the instruments MAT and teaching the topics selected for this study. The researchers' assistants are Mathematics teachers with sound knowledge and years of teaching

experience and the researchers monitor their activities. A week training programme was organized with the research assistants. Thought, pre-test was initially conducted to know the students existing knowledge before the training. The training programme was to acquaint the research assistants with how to use FAS and GCS in the experimental group A and B as well CTM in control group C. The following features were addressed during the training: the objectives of the strategy, topics, contents, duration, teaching' and students' activities, methods and how the test administration, scoring of tests papers were discussed and research assistants were given the opportunity to demonstrate the use of the strategies in teaching before the commencement of the treatment.

The training ensured that the teaching was comparable, applying the same teaching skills with little or no variation in their teaching effectiveness. Items for the tests lasted for one hour fifteen minutes. During the period of testing, the researchers and research assistants ensured that the students were not cheating. Test items were given to the students as a pretest for the purpose of ascertaining the prior knowledge of the students in Social Studies before the treatment was given to the experimental groups. Students were required to encircle the correct option out of four alternatives (A, B, C, D) provided for each question on the answer sheet. After the time allocated for the test, the scripts were collected marked and scored using a marking scheme. The experimental group A students were taught using FAS, experimental group B students were taught GCS while control group C students were taught using CTM covering four lessons taught within seven weeks (4 time lessons in every week).

At the end of the seven weeks of teaching, the posttest on MAT was administered to both the two experimental and control groups. The posttest lasted for one hour, twenty minutes. The pretest and posttest results were compared to obtain the mean gain scores of the experimental and conventional groups. Means, standard deviation were used for answering research question and analysis of covariance (ANCOVA) using IBM SPSS version 23 was used for testing hypotheses at 0.05 level of significant. The results are presented in below tables.

RESULTS

Research Questions/Hypotheses

RQ1: Is there any statistical significant difference in the achievement mean scores of students taught Mathematics using FAS, GCS and those in CTM in Nasarawa Eggon LGA of Nasarawa State, Nigeria?

Table 2: Achievement Mean Scores and Standard Deviation for the two Experimental and Control Groups

Groups	Treatment	N	Pre-test		Post-test		Achievement Gain
			Mean	SD	Mean	SD	
A:	Used of FAS	41	15.25	3.90	19.88	4.45	4.63
B:	Used of GCS	41	15.21	3.90	19.80	4.44	4.59

C:	Used of CTM	43	15.42	3.92	17.38	4.16	1.96

Table 2 above shows statistical significant difference in the achievement mean scores of students taught Mathematics using FAS, GCS and those in CTM in Nasarawa Eggon LGA of Nasarawa State, Nigeria. Pre-test mean scores of 15.25, 15.21 and 15.84 with standard deviation of 3.90, 3.90 and 3.92 for the three groups while, post-test mean scores of 19.88, 19.80 and 17.38 with standard deviation of 4.45, 4.44 and 4.16 for the three groups. The variations between the pre-test and post-test mean score for the three groups were 4.63, 4.59 and 1.96 as means achievement gains. These implies that students taught Mathematics using FAS, GCS gained higher achievement mean than those in CTM.

To test the variation effects of the treatments, the Ho1 was tested using ANCOVA at the 0.05 level of significant and results are presented in Table 3.

Ho1: There is no statistical significant difference in the achievement mean scores of students taught Mathematics using FAS, GCS and those in CTM in Nasarawa Eggon LGA of Nasarawa State, Nigeria

Table 3: ANCOVA Test for Significant Difference in Achievement Mean Scores for the Three Groups

Source of Variation	Type III Sum of Squares	Df	Mean Square	F_{cal}	P-value	Sig
Corrected model	44304.53	3	22152.27	189.028*	.001	P<0.05
Intercept	620.99	1	253.17	44.716*	.001	P<0.05
Pre-MAT	6462.22	1	2594.72	116.15*	.001	P<0.05
Groups	41308.84	1	168.23	422.280*	.001	P<0.05
Error	5953.29	122	46.26			
Total	344586.00	125				
Corrected Total	50257.82	124				

Table 3 shows the ANCOVA for significant difference in the achievement mean scores of students taught Mathematics using FAS, GCS and those in CTM. (df=1, 122, F_{cal} =422,28 p<0.05). This suggests a statistically significant difference between the mean achievement scores of Mathematics using FAS, GCS and those in CTM. Hence, Ho1 was rejected. Hence there is a statistical significant difference in the achievement mean scores of students taught Mathematics using FAS, GCS and those in CTM in Nasarawa Eggon LGA of Nasarawa State, Nigeria.

RQ2: Is there any statistical significant difference in the interest mean scores of students taught Mathematics using FAS, GCS and those in CTM in Nasarawa Eggon LGA of Nasarawa State, Nigeria?

Table 4: Interest Mean Scores and Standard Deviation for the two Experimental and Control Group

Groups	Treatment	N	Pre-test		Post-test		Achievement Gain
			Mean	SD	Mean	SD	
A:	Used of FAS	41	15.25	3.90	20.88	4.56	5.63
B:	Used of GCS	41	15.21	3.90	20.80	4.56	5.59
C:	Used of CTM	43	15.42	3.92	17.38	4.16	1.96

Table 4 shows interest mean scores of students taught Mathematics using FAS, GCS and those in CTM in Nasarawa Eggon LGA of Nasarawa State, Nigeria. Pre-test mean scores of 15.25, 15.21 and 15.84 with standard deviation of 3.90, 3.90 and 3.92 for the three groups while, post-test mean scores of 20.88, 20.80 and 17.38 with standard deviation of 4.56, 4.56 and 4.16 for the three groups. The variations between the pre-test and post-test mean score for the three groups were 4.63, 4.59 and 1.96 as interest means gains. These implies that students taught Mathematics using FAS, GCS gained higher interest mean scores than those in CTM. To test the variation effects of the treatments, the Ho2 was tested using ANCOVA at the 0.05 level of significant and results are presented in Table 5.

Ho2: There is no statistical significant difference in the interest mean scores of students taught Mathematics using FAS, GCS and those in CTM in Nasarawa Eggon LGA of Nasarawa State, Nigeria

Table 5: ANCOVA Test for Significant Difference in Achievement Mean Scores of three Groups

Source of Variation	Type III Sum of Squares	Df	Mean Square	F_{cal}	P-value	Sig
Corrected model	44304.53	3	22152.27	189.028*	.001	P<0.05
Intercept	620.99	1	253.17	44.716*	.001	P<0.05
Pre-MII	6462.22	1	2594.72	116.15*	.001	P<0.05
Groups	41308.84	1	168.23	442.280*	.001	P<0.05
Error	5953.29	122	47.26			
Total	344586.00	125				
Corrected Total	50257.82	124				

Table 5 shows the ANCOVA for statistical significant difference in the interest mean scores of students taught Mathematics using FAS, GCS and those in CTM. (df=1, 122,

F_{cal} =422,28 p<0.05). This suggests a statistically significant difference in the mean interest scores of student taught Mathematics using FAS, GCS and those in CTM. Hence, Ho1 was rejected. Hence there is a statistical significant difference in the interest mean scores of students taught Mathematics using FAS, GCS and those in CTM in Nasarawa Eggon LGA of Nasarawa State, Nigeria.

DISCUSSION

Table 2 above shows statistical significant difference in the achievement mean scores of students taught Mathematics using FAS, GCS and those in CTM in Nasarawa Eggon LGA of Nasarawa State, Nigeria. Pre-test mean scores of 15.25, 15.21 and 15.84 with standard deviation of 3.90, 3.90 and 3.92 for the three groups while, post-test mean scores of 19.88, 19.80 and 17.38 with standard deviation of 4.45, 4.44 and 4.16 for the three groups. The variations between the pre-test and post-test mean score for the three groups were 4.63, 4.59 and 1.96 as means achievement gains. These implies that students taught Mathematics using FAS, GCS gained higher achievement mean than those in CTM. Drawing inference from Ho1 in Table 3 shows the ANCOVA for significant difference in the achievement mean scores of students taught Mathematics using FAS, GCS and those in CTM. (df=1, 122, F_{cal} =422,28 p<0.05). This suggests a statistically significant difference in the mean achievement scores of students taught Mathematics using FAS, GCS and those in CTM. Hence, Ho1 was rejected.

Hence, there is a statistical significant difference in the achievement mean scores of students taught Mathematics using FAS, GCS and those in CTM in Nasarawa Eggon LGA of Nasarawa State, Nigeria. This finding is in agreement with that of Galle, Ezeofor and Ofomata (2022) findings revealed that students taught Mathematics using formative assessment with big data analytics achievement higher than their counterpart students in conventional group. In the same vein, Galle, Sabo and Kwoku (2022) finding revealed that, there is significant difference in the achievement mean scores of students taught Social Studies using peer assessment strategy (PAS), using Model and those taught using conventional teaching method (CTM) and there is significant difference between the interest mean scores of students taught social studies using PAS, model and CTM.

Lastly, Table 4 shows interest mean scores of students taught Mathematics using FAS, GCS and those in CTM in Nasarawa Eggon LGA of Nasarawa State, Nigeria. Pre-test mean scores of 15.25, 15.21 and 15.84 with standard deviation of 3.90, 3.90 and 3.92 for the three groups while, post-test mean scores of 20.88, 20.80 and 17.38 with standard deviation of 4.56, 4.56 and 4.16 for the three groups. The variations between the pre-test and post-test mean score for the three groups were 4.63, 4.59 and 1.96 as interest means gains. These implies that students taught Mathematics using FAS, GCS gained higher interest mean scores than those in CTM. Drawing inferences from Ho2

in Table 5 shows the ANCOVA for statistical significant difference in the interest mean scores of students taught Mathematics using FAS, GCS and those in CTM. (df=1, 122, F_{cal} =422,28 p<0.05). This suggests a statistically significant difference in the mean interest scores of students taught Mathematics using FAS, GCS and those in CTM. Hence, Ho2 was rejected. Hence there is a statistical significant difference in the interest mean scores of students taught Mathematics using FAS, GCS and those in CTM in Nasarawa Eggon LGA of Nasarawa State, Nigeria. This finding is in agreement with that of Ugodulunwa, and Anikweze (2019) findings revealed that formative assessment lead to increase positive attitude and improved Social Studies achievement of the students. Also Galle (2021) finding reveals that the use of CAI-course-lab 2.4 is more effective in enhancing students' achievement and interest in Economics than conventional instructional teaching method.

CONCLUSION

Based on these findings, it was concluded that FAS, GCS had more effective in enhancing students' achievement and interest in Mathematic than CTM in Nasarawa Eggon LGA of Nasarawa State, Nigeria. This is beaus most of the students exposed to Mathematics teaching using FAS, GCS had achieved and demonstrated high interest than those students exposed to CTM in Nasarawa Eggon LGA of Nasarawa State, Nigeria.

Recommendations

Based on these findings, the study made the following recommendations thus: Nasarawa State Ministry of Education should formulate policies that will mandate Mathematics teachers to use formative assessment strategy (FAS) and guidance counseling strategy (GCS) to enhance students' interest and academic achievement in teaching Mathematics and Niger State Ministry of Education should organize workshop/seminar to educate Mathematics teachers on how to use teaching strategies to enhance students' interest and academic achievement in Mathematics.

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