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Original Research Article

Effect of Assessment for Learning Strategy (AFLS) on Student's Achievement and Interest in Senior Secondary School Mathematics in Ondo State

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Abstract: The paper examined the effect of assessment for learning strategy (AFLS) on Student's Achievement and interest in Senior Secondary School Mathematics in Ondo State. The study employed quasi experimental research design involving the non-randomized prelest, postlest, control group. The population comprises all Senior Secondary II students in Akoko North East Local Government, Area of Ondo State. A sample size of 100 Senior Secondary II students from two public Secondary school was used for the study. The sample was randomly grouped into one experimental and control. Data were collected using Mathematics Achievement Test (MAT) (r=0.76) and Mathematical Interest Inventory (MII) (r =0.82). Two hypotheses were generated to guide the study. The findings revealed that there was significant effect of instrument on students' performance and interest with a (F value 4.161 and p value 0.000) at 0.005 level of significance based on the findings, it was recommended that Assessment for learning strategy should be employed or adopted in teaching Secondary students to enhance their interest in mathematics.
Keywords: Assessment for learning strategy, academic achievement, interest.

INTRODUCTION

Assessment is a critical step in the learning process. It helps us to discover if the course's learning objectives are achieved. A learning objective is what students should know at the end of a lesson. Assessment is a one way process where teachers give students feedback about their work improving student's performance and also arousing their interest in the subject area been taught. With an AFL strategy, teachers give learners task specific evaluation on the work done rather than personality specific evaluation that focuses on personal qualities of the learner. This enhances every learner interest and so as to improve their performances (American Psychological Association).

The benefits of AFL includes: Improving learner outcomes, helps create a sense of self-eficacy in learners confidence in their ability to reach targets through hard work, helps learners to reflect on their own learning to understand how they learn best and to interpret new knowledge, skills and conceptual understanding that they have acquired.

AFL helps in making understanding and knowledge (John Haltie) more visible. He further stress

it helps learners knows the meaning of excellence and how they can develop their own work to reach that level. Feedback is believed to have positive impact on learners' achievement (Haltie 2011).

According to Cambridge Association of International Education, there are five major steps that take place in assessment for learning: The first is Questioning enables a student with the help of the teacher to find out what level they are at. Secondly, teachers provide evaluation on how they performed so as to make student improve their learning. Thirdly, students understand what successful work looks like for each task they are doing. Students become more independent in their learning as they take part in peer assessment and self-assessment summative assessment.

Mathematics is one of the compulsory subjects in the Secondary education curriculum in Nigeria. According to the Nigerian Education Research and Development Council (NERDC, 2012) the general objectives of Mathematics are to develop the ability.

NERDC also stipulates the instructional methods to be used for the teaching and learning of mathematics. Despite all the recommended instructional

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tools, the teaching of Mathematics is based on the conventional method of teaching which can affect the performance of students. According to Ilogho (2019) and Akinoso (2017) observed poor attitude of students towards mathematics. The implication of this is the poor performances we experience year in year out. Attitude towards mathematics have been considered as a vital tool in enhancing interest and success in mathematics. Mangal (2013) stated using strategy in teaching is what makes a interest while interest is the driving force of the machinery of teaching-learning. Salihu *et al.* (2019) argued that interest as a driving force helps the students in acquiring certain learning experiences, but also colour and fashion their attitudes, aptitudes and other personality.

The displeasing trend of poor performance of students in mathematics could be attributed many factors among which are teacher's strategy. This implies teaching mathematics without instructional material may certainty result in poor academic achievement. Instructional materials are meant to promote effective learning. Assessment is one of the most powerful educational tools for promoting effective learning, yet the use of assessment to enhance learning is one of the least aspects of classroom practices assessment reform group 2002 in Necty (2019). It was observed that teachers mainly rely on qualitative performance as an indicator of learning which is not supposed to be. According to Necty et al assessment for learning involves how to improve learning. It is not enough a student scored a particular score but the process by which that score was produced and how it can be improved (Assessment).
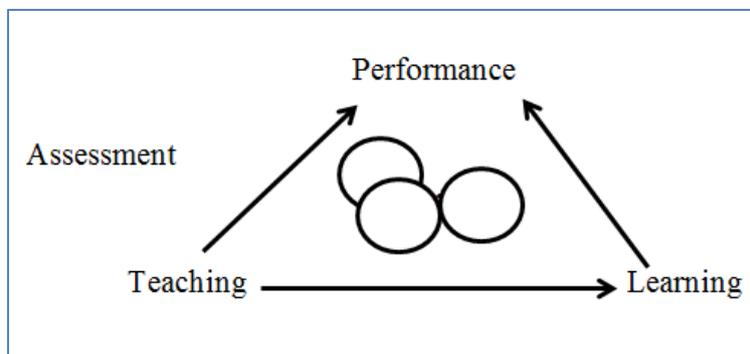

Fig-1

ASSESSMENT
According to Mangal (2007) students can be made interested in learning activity by taking care of
1.   Setting the proper aim and objectives.
2.   Proper selection and organization of learning experiences.
3.   Use of appropriate methods and teaching aids.
4.   Making use of various instincts, emotions, sentiments and ideals of the student.
5.   Taking care of the learning situation environment.
6.   Desirable behavior and determination on the part of the teacher.

Effective teachers employ AFL in their lessons as part of what to do (Salihu *et al.* 2020). AFL approaches are linked to improvements of student achievement and interest in summative tests and examination. Various researches have shown the link of AFL to improvement of student's performance and that it helped low achieving students to enhance their interest and improve their performance (Amakiri and Ukeife 2016, Salihu *et al.* 2020).

Assessment for learning according to Black, Harrisan, Marshall, Lee and William as citied in (Amakiri and Ukuije 2016) defined the strategy as everything done by teachers and learners that serve as information which forms and helps the instruction given the classroom activities.

According to Black *et al*. cited in Amakiri and Ukwuije (2016) identified that AFL strategies are based on, teachers use of questioning, feedback through making peer and self-assessment by students and formative use of summative assessment.

Edwards Grooves (2002) in his research shows effective interaction accumulates to successful learning when students are wholly involve in their assessment. This makes students to invest in their own learning which eventually leads to increase in interest, and improvement in performance in the subject.

Statement of the problem
Researchers have observed that Assessment for learning strategies have been introduced in developed countries and its effect on achievement and interest was significant. However, this, AFL strategies are yet to be introduced to Nigeria Classroom systems to the best of the researcher knowledge. Hence, the reason to investigate the effect of AFL strategy on secondary school student's achievement and interest in mathematics.

Research Questions

The following research questions were raised to guide the study.
1. What is the mean achievement score of mathematics students taught with assessment for learning and conventional teaching method?
2. What are the mean interest scores of student with assessment for learning and conventional teaching method?

Hypotheses

The following hypotheses tested at p<0.05 guided the study.
1. There's no significant difference in the mean performance of mathematics students thoughts with assessment for learning and conventional teaching strategies.
2. There is no significant main effect of treatment on student's interest in mathematics.

METHODOLOGY

The study adopted a quasi-experimental non-randomized pre-test, post-test design. The population of the study consisted of all SSS II students in Akoko South West local government area of ondo state. Using random sampling technique, two secondary schools were purposively selected from the local government area. 100 students were selected from the two secondary schools for the study. School 1 was tagged Experimental group while school 2 was tagged control group. The classes were assigned experimental (Assessment for Learning Strategy (ALS) and control (conventional method (CM) groups by balloting. The students were randomly assigned into experimental (50) and control groups (50).

The instrument used for data collection was 30-items multiple choice Mathematics Achievement Test (MAT) adopted from Ilogho (2019) and Mathematics Interest Scale (MIS) constructed by the researcher. The validity of the MIS was established by two experts in test and measurement, AAUA. The reliability coefficient of MAT was 0.67; and MIS 0.79 using Kuder-Richardson 20 method for MAT and Cronbach Alpha method for MIS.

The MIS is made of two sections.

Section A for the background information of the students and section B consists of 30 items soliciting student's level of interest.

The students were taught for four weeks with assessment for learning strategy.
Week 1; use of questioning students was involved in classroom activities.
Week 2; the students were exposed to feedback through teacher's comment on markings
Week 3; the experimental group students were exposed to self/peer assessment in classroom activities based on the topics taught. They were paired together to facilitate fast learning.
Week 4; the students were exposed to formative use of summative assessment.

The control group was evaluated during the learning teaching process based on conventional teaching methods of continuous evaluation. The post-test instrument which was non-equivalent form of the pre-test instrument was administered as part of the student's continuous assessment in the 5th week after the completion of the study.

The research questions were answered using mean and standard deviation, while the hypotheses were tested using analysis of covariance (ANCOVA) and t-test at 0.05 level of significance.

RESULTS

Research Question 1

What are the mean achievement scores of mathematics students taught with the assessment for learning strategy and conventional teaching method?

Table-1: Pretest and post-test mean scores of students taught mathematics using assessment for learning and conventional method.

Instructional Strategy	N	Pre-test mean	SD	Post-test mean	SD	Achievement mean gain
Assessment for learning	50	41.28	10.13	73.26	12.96	31.98
Conventional method	50	41.89	11.91	50.38	10.37	8.49

Result in Table 1 revealed that the students taught using assessment for learning strategy had a post-test mean score of 73.26 with a standard deviation of 12.96, while the students taught using the conversional method had a post-test mean score of 50.38 and standard deviation of 10.37. The mean gains of the AFL of 31.98 as against 8.49 mean gain of conventional method indicate the AFL experimental group performed better than students taught with conventional method.

Hypothesis one

There is no significant difference in the mean performance score of mathematics students taught with Assessment for Learning Strategy (AFLS) and conventional method (CM).

Table-2: Analysis of Covariance (ANCOVA) for the mean performance of mathematics students taught with the Assessment for learning strategy and conventional method (CM).

Source of variation	Sum of squares	DF	Mean square	F	P-value	Decision
Connected model	15046.529	2	7208.14	62.350	.000	
Intercept	8050.808	1	8050.808	69.770	.001	
Pretest	1398.489	1	1398.489	12.108	.000	
	3372.586	2	3372.586	18.425	.001	
Error	11238.347	97	222.067			
Total		100				
Connected Total		99				
G.R squared =						

The Table 2 revealed that the probability value associated with the calculated value of F (18.425) for the mean achievement scores of two groups of mathematics students taught with the Assessment for learning strategy and conventional method is .001 since .001 P-value is less than the 0.05 alpha value of 0.05 level of significant with (99) degree of freedom, the null hypothesis is rejected which implies that there was significant difference in the mean performance scores of mathematics students taught with Assessment for learning strategy and conventional method strategy.

Table-3: T-test of significance of the mean scores of mathematics students taught with Assessment for learning strategy and conventional method.

Groups exposed to:	N	Mean	SD	DF	Tcal	Tcri	Decision
ALS	50	30.059	4.06	98	2.72	1.66	Rejected
CM	50	24.59	2.78				

*Significant at 0.05 alpha level.

Table 3 revealed that there is significant difference in the performance of students when exposed to Assessment for learning and conventional method in mathematics. The reason is that the calculated value of 2.72is greater than the table value of 1.66

Research Question 2
What are the mean interest scores of mathematics students using Assessment for learning strategy and conventional method?

Table-4: Pretest and post- test mean interest scores of students taught with Assessment for learning and conventional method interest.

Treatment	N	Pre-test mean	SD	Post-test mean	SD	Gain
Assessment for Learning Strategy	50	42.26	13.69	70.78	13.96	28.52
Conventional method	50	38.78	9.89	53.38	10.47	14.60

Table 4 showed that students taught with Assessment for learning had a post-test interest mean score of 70.78 with a standard deviation of 13.96, while students taught with conventional method had post-test interest mean scored of 53.38 with 10.47 standard deviation of 10.47. The different in the mean interest gained is higher in Assessment for learning than conventional method.

Hypothesis 2
There is no significant main effect of treatment on student's interest in mathematics.

Table-5: Summary of ultimate ANCOVA for students interest scores in mathematics

Source	Type III sum of squares	df	Mean square	F	P-value	Decision
Connected model	245.124	2	122.562	3.361	.001	
Intercept	671.064	1		2.689	.008	
Pretest	898.006	1		2.864	.005	
Group	1228.182	1		2.146	.033	
Error	3480.420	97				
Total	12499.171	100		4.542	.000	
Connected Total		99				

Table 5 shows that students in the two public secondary schools used for the study demonstrated similar level of interest prior to treatment $F_{(1.99}= 0.454$; P= 0.422). But after the treatment on students interest in mathematics as they were exposed to AFL strategy (F $_{2,98}= 22.688$; P= 0.000.

This implies a significant difference between the mean interest scores of students taught mathematics using Assessment for learning strategies and conventional method. Thus the null hypothesis is rejected. This suggests that treatment has effect on mean interest scores of mathematics students. To

further established the significance of mean interest difference. T test analysis was carried out on the mean interest scores which is presented in table 6.

Table-6: T-test analysis on Effects of Assessment for learning strategy on student's interest in mathematics

Group	N	Mean	SD	Df	T-value	P-value	Decision
Experimental Control	50	76.57	7.65	98	7.68	0.003	Sig
	50	48.54	4.87				

Table 6 shows t = 7.68 df = 98 and p = 0.003 since p < 0.05, the null hypothesis was rejected. This suggests that there exist significant differences between the mean interest scores of SS II student taught mathematics using AFL and those taught using CM.

DISCUSSION

The findings from table 1 revealed the mean scores of students taught mathematics using Assessment for learning and the mean scores of those taught with ALS are higher than those students taught with conventional method. Table 2 also showed that the difference in the achievement gained was significant. This agrees with the findings of Amakiri & Ukwuije (2016), Salihu *et al.* (2020) that students who were taught using Assessment for learning strategy achieved significantly higher in Biology and mathematics than those who were taught using conventional method. The implication of this is that, AFL aid students to enhance interest in mathematics concepts and thereby achieve higher in the subject.

CONCLUSION

Based on the findings of this study, it was concluded that Assessment for learning strategy is effective in enhancing student's interest in mathematics than conventional method. Based on the conclusion of the study the following recommendations were made

1. The Ondo State Ministry of Education should encourage teachers to use Assessment for learning strategy to teach mathematics.
2. Capacity Building Workmanships should be organized by Ondo State Ministry of Education for mathematics teachers in all schools irrespective of the location.
3. Assessment for learning strategy should be incorporated into secondary school mathematics conclusion by curriculum planning and policy makers of Education so that teachers effectively implement Assessment for teaching mathematics.

REFERENCES

- Akanbi, A.A., & Kolawole, C.B. (2014). Effects of guided discovery and self- learning strategies on senior secondary school student's achievement in biology, *Journal of Education and Leadership Development, 6*(1), 19-42.
- Akinoso, S.O. (2016). Effects of concrete Representational – Abstract strategy on senior secondary school students' attitude to mathematics. *Ijotre B. Annual,* 17; 73-79.
- Amakiri, H.A.E. (2012). Effect of cooperative learning and school location on student's achievement in Biology. The Educational Psychological Journal of the Nigerian Council of Educational Psychologist, *6*(1), 174-182.
- Amakiru, H.A.E., & ukwuije, R.P.I. (2016). Effect of Assessment for learning (AFL) on Biology Academic Achievement of senior secondary students in River State *European Journal of Educational and Development Psychology, 4*(2); 12-24.
- Assessment Reform Group (ARG). (2002). Assessment for learning beyond the black box. Retrieved from http://org.educ.cam.ac.uk/assessinsides.pdf on 18 January, 2022.
- Black, P. Harrison, C, Lee, C., Marshall, B., & William, D. (2003). Assessment for learning, putting it into practice. Maidenhead, Open University Press Retrieved January, 20, 2022 from www.amazon.co.uk7books? Science of natives Education.
- Edwards – Grooves, C.J. (1998). The Reconceptualization of classroom events as structured lessons. Documenting changing the teaching of literacy in the primary school. Unpublished Doctoral Thess, Griffith University
- Harrison, C., & Hailen, W. (2006). Children's self and peer-assessment in Hailen W.(ed) ASF Guide to primary science education Hatfield, Association for Science Education.
- Nenty, H. J., & Lusweti. L. (2020). Assessment for learning (AFL): Implications for the Achievement of the Goals of Basic Education in Africa.
- Ogunleye, B. O., & Akinoso, S. O. (2016). Effect of Explicit Instructional Strategy on Senior Secondary School Students' Attitude to Mathematics IJOTRE Bi-Annual, *17*(2), 70-77.
- Salihu A. G, Okolo, I.A., & Uwelo, D. (2020). Effects of Assessment for learning and Geogebra on Mathematics Achievement and interest in colleges Education in Nasarawa State.
- Salihu, A. M., & Ochefe A. (2019). Comparative Effects of Models and concept mapping on Students' Interest in Junior Secondary School Social Studies in Kogi State, Nigeria. *Journal of Measurement and Evaluation, AAUA, 2*(1), 115-127.
- Ukuwuye, R.P.I. (2012). Educational assessment: A sine quo for quality education. inaugural Lecture series No.83, University of Port-Harcourt, Rivers State.