

# **EFFECT OF FORMATIVE TEST ON ACHIEVEMENT OF STUDENTS IN AGRICULTURAL SCIENCE IN GOVERNMENT SECONDARY SCHOOL, SHIYA, KWARA STATE.**

**BY**

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## **Abstract**

*This research investigated the effect of formative test on the achievement of students in Agricultural Science in Government Secondary School Shiya, Kwara State, Nigeria. Three hypothesis were formulated and addressed one after the other. Non-equivalent pre-test post-test control group quasi-experimental design was adopted for the study. Intact classes purposively selected from the UBE section of the school. (UBE 2A, and UBE 2B), control and experimental groups respectively was involved as the population. The instruments used for this research were pre-test, diagnostic formative tests, parallel formative tests. Agricultural Science Achievement Test. (ASAT) was used as post-test. Findings showed that formative Test significantly improved students' achievement in Agricultural Science. Analysis of Covariance was used to test the hypotheses, at 0.05 level of significance. The result obtained showed that the group exposed to treatment (Formative Test) performed significantly better than the control*

*group. The second finding shows that the use of practical work in formative test contributed immensely to the achievement rate of the experimental group. So also, gender was found not to be a threat to learning, as there was no significant difference in the performance of male and female students in Agricultural Science. Based on the findings of this study, it was concluded and recommended that formative test should be adopted so as to attain better academic achievements among secondary school students.*

**Keywords:** Types of tests, Formative processes, correctional feedback mechanism, and academic achievement

## **Introduction**

Test is one of the tools of continuous assessment or School Based assessment (SBA). Test is a means of assessing the educational achievement for the purpose of providing guidance and determining special teaching needs. Test brings out for observation and assessment such specific attributes or characteristics as abilities, knowledge, skills or feeling of person or individual, improving study habit, diagnosing talents and learning difficulties of learners to make decision for their selection or placement. (Abiri, 2007).

Owolabi, (2004) opined that a test is a sample of behaviors drawn to ascertain traits, character or skills and the extent to which these are present or absent in a given individual or group. There are different types of test used in education. The variant commonly used in teaching and learning which is often prepared and used by teachers is achievement test (Formative and Summative Tests). Other forms, includes intelligence, aptitude and personality tests. Formative test which is the ‘heart’ of this research was described by Paule, Graham, Joan & Shewbridge (2011), as an integral part of student learning, which if administered correctly throughout the school year provide an effective way to discover and correct problems in teaching and learning. It is a simple highly effective tool that can profoundly affect both learning and the climate in which learning takes place. It also measure progress of learning during instruction or teaching rather than after instruction to grade and rank. Sharma (2023) enlisted the types of formative testing as, short quizzes, pre-class open-ended questions, end of class poll, word cloud, concept mapping, peer assessment and class discussions.

Ayodele (2015), noted that formative test can also be enhance by listening carefully what the learners are saying, as well as look at the way learners carry out their work. Not just finished product or written account or answers. For effective formative test, it requires the interaction of general principles, strategies and techniques with reasonably deep cognitive domain understanding. That deep cognitive domain understanding includes to the processes strategies and knowledge that is important for proficiency in a domain. The habit of mind that characterized the kind of elements of formative test The key elements are:

Establishment of classroom culture that encourages Interaction and the use of assessment tools.

Establishment of learning goals and tracking of individual student's progress toward those goals

Use of varied instructional method to meet diverse needs

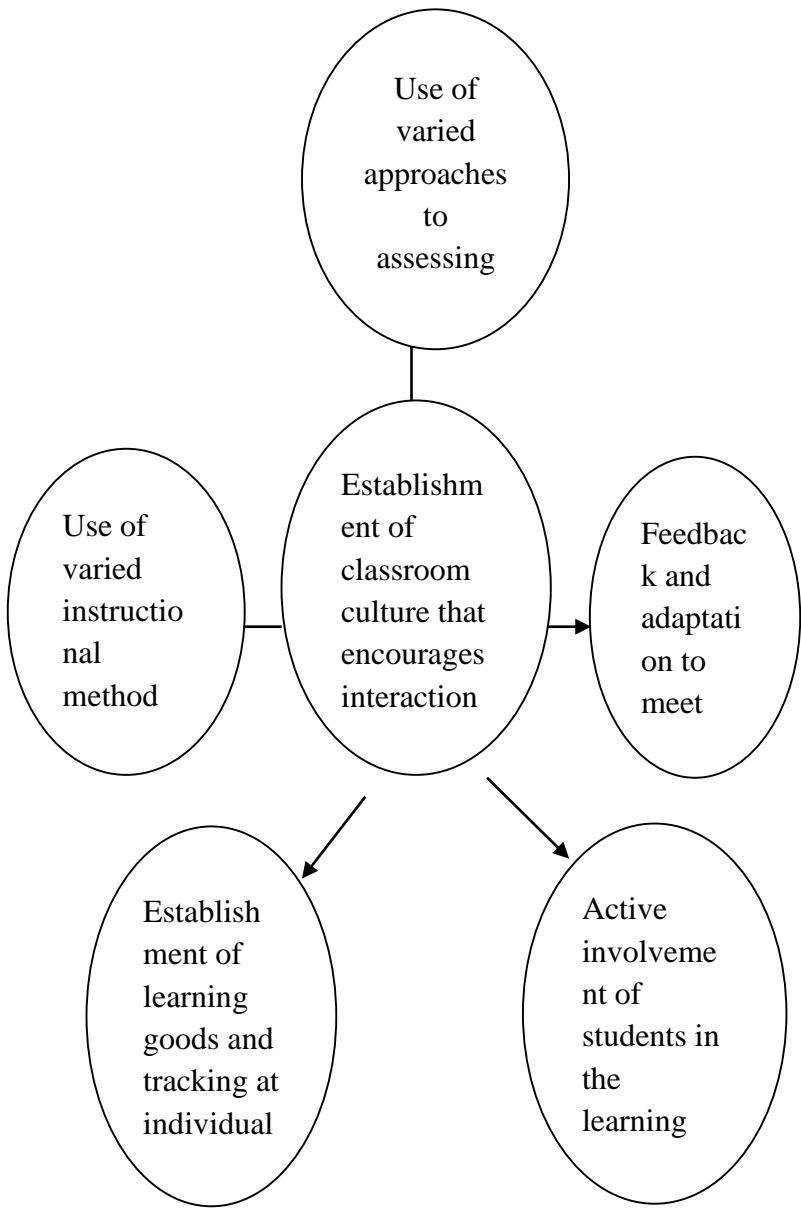
Use of varied approaches to assessing student understanding

Feedback on student performance and adaptation to meet identified needs

Active involvement of students in the learning process.

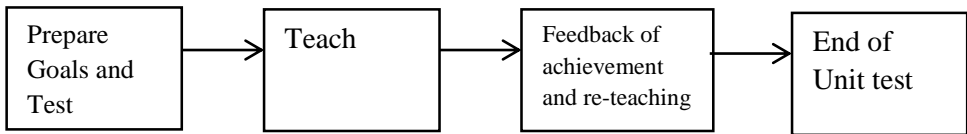
The keys can also be explained diagrammatically as shown in figure one below.

Figure 1.



Source:- Centre for Education Research and Innovation (2013)

Figure 2. Classroom Sequence of Formative Process



Source:- Garison & Michael (2010). Formative and summative assessments in classrooms.

Formative process like the above diagram is expected to be use in Government Secondary school Shiya, in order to enhance qualitative educational achievement, which the researcher wants to find out. The essential Features of the Formative Testing are: Stating the belief system, setting goals and measuring and acting on test information.

The significance of formative testing as argued by Irina, Miguel, Myrian & Gema (2019), shows that teachers who apply formative testing frequently in their classes will demonstrate strength, talents, weakness, and qualities that the students have, promote values such as, solidarity, mutual agreement and respect. This will also enables the teacher to modify the teaching and assessment practices, thereby turning the classroom into a place for collaborative learning that will generate in them feelings of pride, satisfaction and the scope of objectivity, goal and desired projection.

The rate of decline in academic achievement in secondary schools is alarming, and the phenomenon is attributed to a number of factors including poor assessment during lessons. This research is aim at assessing the effectiveness of formative test as against lecture method that is common in secondary schools. The frequency in assessment coupled with corrective feedbacks may be the solution to these decline in students' educational achievement because assessments generally motivate and encourage teaching learning. Many researchers have written a lot about formative test in different subjects and locations. For example, researchers like Akanbi (2014) wrote on construction and validation of formative test in financial accounting, but did not find out the effect of this teaching strategy on Agricultural Science. Adewoye (2014), also researched on the effect of formative test on Junior Secondary School Students' Achievement in Mathematics, but not in Agricultural Science. In addition, Akpokiere

(2004), researched on comparison of academic achievement of students who had adequate practical guidance and those who did not but did not find out whether or not gender has any impact in the learning process if formative testing is used by the teacher.

In addition, Popham, (2006), and Looney (2011), researched on defining and enhancing formative assessment in the classroom, and integrating formative and summative assessment in the classroom, respectively. They carried out their research outside of Nigeria. Their research findings shows that formative testing promote academic achievement. These researchers did their findings in formative testing in other subjects and in different locations either within the country or outside of the country. But none had studied the effect of formative testing in Agricultural Science in the specified location of this research, hence, this research wants to bridge the gap on this phenomenon that may arise as a result of poor testing method in the location of this research, in Agricultural Science in Government Secondary School Shiya.

The main purpose of this research is to find out the effect of formative test on achievement of students in agricultural science in Government Secondary School Shiya, Baruten Local Government Area of Kwara State Nigeria. Specifically this study found out:

1. The teaching learning strategies in Government Secondary School Shiya.
2. Effects of effective use of formative test in practical Agricultural Science lesson.
3. The difference in achievement between male and female students in the use of formative test during agricultural science lesson.
4. Learning problems, and recommend better solutions

The following research questions guided the study

1. What is the effect of Formative testing on UBE students' achievement in Agricultural Science?
2. What are the diagnosed learning problems of the UBE students?
3. What remediation procedures were most helpful for addressing identified learning problems?
4. What is the effect of formative test in the achievement of male and female students in Agricultural Science?

## **Research Hypotheses**

The following research hypotheses were tested using an appropriate instrument at 0.05 level of significance.

H<sub>01</sub> There is no significant effect of formative test on the achievement of students in Agricultural Science.

H<sub>02</sub> There is no significant effect on the use of formative test in students' performance in practical Agricultural Science.

H<sub>03</sub> There is no significant difference between male and female students' achievement if formative test is used in teaching Agricultural Science.

## **Methodology**

The design of this study is quasi-experimental design. Quasi experimental design is utilized where it is not possible to randomly select samples from the population. The population for this study was made up of all upper basic school students in Government Secondary school Shiya. Specifically upper basic two offering agricultural science was used for this research. Two intact classes of UB II (A&B) was selected purposively for the treatment group and for control group respectively. The instrument used for obtaining information in this study was Agricultural Science Achievement Test (ASAT) A forty (40) item multiple choice questions of 4-options adopted from the past standardized Basic Education Certificate Examination (BECE 2014) organized by the Kwara State Ministry of Education and Human Capital Development, and ten (10) theory practical question. Even though the instrument was assumed accurate and reliable as it was adopted from a standardized test, yet the researcher subjected the instrument to validity test, using Crombach Alpha. And 0.81 coefficient was obtained.

The ASAT has both construct and criterion related validity as assessed by the experts in the social sciences Education Department, Faculty of Education University of Ilorin. Its Empirical validity was ensured through trial testing in neutral school using test-retest method and the reliability co-efficient calculated using Pearson product moment correlation co-efficient. A reliability index of 0.807 that is significant at the 0.01 level was obtained. . The scores of the two groups obtained through the tests were analyzed using Analysis of Co-variances (ANCOVA) and the interpretation was compared with the hypotheses generated earlier in this research.

H<sub>01</sub>: There is no significant effect of formative test on student's achievement in theory aspect of Agricultural Science. In order to answer this hypothesis, Analysis of Covariance (ANCOVA) was employed and the results were presented in Table 3

**Table 1: ANCOVA Summary effect of formative test on students' achievement in theory aspect of Agricultural Science**

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	16616.434 <sup>a</sup>	2	8308.217	456.760	.000
Intercept	15005.246	1	15005.246	824.942	.000
PRETEST	53.330	1	53.330	2.932	.090
GROUP	16613.684	1	16613.684	913.369	.000
Error	1818.945	100	18.189		
Total	68640.000	103			
Corrected Total	18435.379	102			

a. R Squared = .901 (Adjusted R Squared = .899)

Result in Table one shows that the calculated  $F(1, 100) = 913.369$ ,  $P=0.000$  since the significant level of 0.000 is less than 0.05 alpha level (i.e.  $p<0.05$ ), therefore the null hypothesis stated above is hereby rejected. Therefore, the finding shows that, there is a significant effect, of formative test on achievement of students in Agricultural Science. .

H<sub>02</sub>: There is no significant effect of formative test on the achievement of students in practical Agricultural Science.



**Table 2: ANCOVA Summary of effect of Formative Test on Students' Achievement in Practical Agricultural Science**

**Tests of Between-Subjects Effects**

**Table 4:**

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	3976.873 <sup>a</sup>	2	1988.437	335.334	.000
Intercept	3404.563	1	3404.563	574.153	.000
PRETEST	.282	1	.282	.048	.828
GROUP	3975.597	1	3975.597	670.453	.000
Error	592.971	100	5.930		
Total	19306.000	103			
Corrected Total	4569.845	102			

The result in Table four shows that the calculated F (1, 100) is 670.453, P = 0.000 since the significant level of 0.000, is less than 0.05 alpha level (i.e.  $p < 0.05$ ). Therefore, the null hypothesis is rejected. This is because the results of the findings depict a significant effect of formative test on the achievement of students in practical Agricultural science.

H<sub>03</sub>: There is no significant effect of gender on students' achievement when formative test is used to teach in Agricultural Science.

**Table 3: ANCOVA Summary of gender difference on students' Achievement in Agric. Science**

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	211.976	2	105.988	8.582	.561
Intercept	12681.750	1	12681.758	69.590	.000
Pre-test	3.030	1	3.060	0.17	0.897
Gender	209.227	1	209.667	1.418	.287
Error	18223.402	100	182.234		
Total	68640.00	103			
Corrected Total	18435.379	102			

The result in Table three reveals that, the calculated  $F(1, 100) = 1.148$ ,  $P = 0.287$  since the significant level of 0.287 is more than 0.05 alpha level (i.e.  $p > 0.05$ ). Therefore the null hypothesis stated above is hereby accepted. This implies that students' gender has no effect on their academic achievement even when formative test was used in Agricultural science.

## **Discussion of Findings**

The discussion of the findings of this research is strictly guided by the results of the formulated hypothesis. From the statement of the problem the researcher aimed at finding out the effect of Formative test in the achievement of students in Agricultural Science in UBE 2, curriculum. The effect of formative tests was realized in this research because the achievement level of students has improve significantly after using formative process to teach different topics during the experiment. There was no doubt that students in the experimental group achieve by far better than their counterparts in control group. The result of these research agreed with that of Melmer & James (2008); Popham (2006) in their findings, they argued that assessment test is formative to the degree that the information collected from the test is used during the assessed instruction period to improve students achievement.

However, the result of this research did not agree with the findings of Mueller (2014) whose finding showed that traditional assessment like formative test do not give maximum impact on students' learning, rather, authentic assessment was the preferred process for effective learning because it emphasis higher order thinking strategies for learners. Secondly, the findings of this research showed that, there is a significant effect in the use of practical work in teaching formative test in agricultural Science. The findings agreed with that of Owolabi (2011) whose findings was based on the school base assessment and its importance in the school system, likewise the findings of Tony (2004), whose findings are based on students personal or practical work which enhances academic achievement. This shows that practical work promotes students' achievement.

The Findings also shows that there is no significant effect in the performance of male and female students in Agricultural Science. Of similar findings are Bulmaster, James & Melmer, (2008) whose work centered on attributes of effective formative assessment, their findings

showed that effective use of formative test give higher achievements rate in academics. Fives & Didonato (2013) also agreed with the findings, because their result showed that formative test enhances academic achievement. Their research on practical assessment and evaluation depict that gender is not a factor to learning if effective formative teaching strategy is adopted. This result is also similar to the findings of Alausa (2015) which showed that gender has no significant effect on the achievement of students in Agricultural Science.

## **Conclusion**

Construction and validation of formative test comprises of diagnostic tests and parallel formative tests was made and used. It was evident that formative test help students to understand some basic concepts in Agricultural Science. The constant feed backs and corrective measures adopted in formative test provided a good medium for better comprehension in both the theory and practical.

## **Recommendations**

Based on the findings of this study and conclusion reached, the following recommendations were made.

Agricultural Science Teacher especially those in the UBE section should adopt the use of formative test by preparing table of specification for every lesson unit to be taught, because this will guide and encourage teaching learning environment. Teachers should use varied method of teaching, including practical work, within and outside the class and corrective feedback should be given immediately before the end of each lesson, so that necessary adjustment could be made. The time allocated for Agricultural Science in Secondary Schools should be increased, because of the involvement of practical work, which is time consuming, if effective teaching of the subject is our goal. Workshops and seminars should be organized frequently to sharpen the knowledge of both teachers and students.

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