Exploratory Study of Alternative Procedures for Embedded Assessment in Secondary School Geography in Ilorin, Kwara State, Nigeria

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Abstract
The need for school accountability accompanied by demands that teachers must take responsibility for improving students' performance on standardized test made educators to search for new ways to teach. Assessment is a key process in education and an essential ingredient of accountability. This study explored the effect of embedded assessment on secondary school students' performance in geography. A set of embedded assessment procedures was developed and used among SS1 students. The objective of this study was to find out whether embedded assessment will be effective in the teaching and learning of geography among SS1 students. The pretest, posttest quasi-experimental research design was used for the study. Two public senior secondary schools were randomly selected from a total of 27 public senior secondary schools in Ilorin-west local government area of Kwara state. Instrument used were practical exercises, tests and quizzes as well as projects assignment were developed and embedded into classroom instructions in geography for experimental group while the regular continuous assessment was used in the control group. Analysis of Covariance was used to test the hypotheses formulated. A significant difference was observed between the performance of geography students exposed to embedded assessment and those exposed to the traditional assessment method. This was because the mean performance of experimental group was 31.06 while the mean performance of control group was 20.33. The implication for this study is that embedded assessment brings about better understanding of the subject content and assessment is done as the instruction takes place.

Keywords: *Assessment, Embedded Assessment, geography, quasi-experimental design*

INTRODUCTION

Assessment is a key process in education. It is only through assessment that we can find out whether instruction has had its intended effect, because even the best designed instruction cannot be guaranteed to be effective (William, 2010). One might expect, therefore, that assessment should be reasonably uncontroversial. All those with a stake in the outcomes of education such as learners, teachers, parents, other taxpayers, employers and the wider community want to know what students have learned, and it seems plausible that this can easily be evaluated through the use of straightforward and familiar instruments, such as achievement tests. Tests are designed for a variety of purposes, and their results are used in a variety of ways

Assessment is an indispensable component of any educational system because of its importance: diagnostic, prognostic, certification, promotion, career, placement, selection and guidance played in education. Assessments are meant for obtaining measures of learners' abilities, aptitudes, attitudes, interest and achievement. (Abiri, 2006).

Assessments carried out by teachers helps in determining appropriateness of instructional techniques, refining the instructional methods and materials, and the degree to which the objectives of teaching and learning have been achieved. Results of assessments are used for improving teaching and learning processes (Ugodulunwa, 2003).

It is expected that when learners have undergone secondary education, they should be able to think effectively, communicate their thoughts, make relevant judgment, discriminate among values and make wise decisions and at the end perform well in West African Examination Council, National Examinations Council, Joint Admissions and Matriculation Board, NABTEB and go for further studies. In Nigerian Secondary schools, assessment pattern is focused on achieving high performance and learners look for every possible way to achieve this. This involves assessing learners with the sole aim of preparing them for examinations. Targets are set on the examination's syllabus like WAEC, NECO, NABTEB or JAMB on what to cover and past questions are practiced and memorized. Emphases are placed on obtaining high marks, without regard for understanding or the ability to apply the knowledge gained in the class to the real world, to analyze the outcome of knowledge applied. In summary, assessment is mainly carried out at the end of teaching (summative evaluation).

One of the reforms introduced in Nigeria to improve assessment procedures or activities is the Continuous Assessment (CA). It was formally introduced into the educational system in 1982. Continuous Assessment involves measuring behavior of learners periodically and using the results obtained for taking relevant decisions on the students. Such assessment involves the use of a variety of evaluation instruments for the purpose of guiding and improving the learning and performance of students. According to Gidado (2021) Continuous assessment is introduced to replace the hitherto end of year examination. Also, the introduction of continuous asessment was to allow students perform under a relax atmosphere without unnecessary stress and to further give learners the opportunity to work at their own pace as observed by Gidado and Mustafa (2021).

Another reform that came up in 1997 was School Based Assessment (SBA). It determines the learners' prior knowledge, monitors the progress during the lesson, or after instruction, to obtain feedback on the effectiveness of teaching and learning. School Based Assessment allows for the assessment of a variety of learning outcomes (knowledge, skills and attitude) using different assessment instruments like Essay tests, Examination schedules, checklists, practical tests or performance-based tests, and observations. The use of a variety of

instruments for SBA allows the teacher to effectively assess learners' competencies in specific tasks and skills. School-based Assessment broadens and explains the form, mode, means and scope of assessment in schools in order to facilitate and enhance learning. Since the ultimate purpose is to promote learning, the assessment base is broadened to include not only teachers but also all others that impact on the learner's readiness, capacity, and interest which includes the subject teachers and other teachers, class peers, parents, relevant education agencies (such as school inspectors) and the learner. All these categories of people are incorporated into the assessment process to support, motivate and enable the child to want to learn and to steadily make progress (NTI, 2007).

Performances of learner have not improved significantly since the introduction of SBA in basic schools. It has become necessary to carry out studies on other viable assessment techniques that will bring about significant improvement of learners' performances in Nigerian schools. One of such alternative technique is Embedded Assessment. This is the process of using artifact generated through classroom activities to assess achievement of student learning objectives. It builds on daily work like assignments, tests, projects, quiz, practical and questions embedded in final exams (Mark & Wilson 2000). It includes common questions in test, exams, rubrics used to grade a class, presentations, and specific assignments that provide feedback to the instructor about desired outcomes. Embedded assessment occurs throughout a lesson period rather than at the end of aa class or an instruction. Glencoe and McGraw-Hill (2005) described embedded assessment as a formative assessment and it has the tendency of raising students' achievement levels.

Garretson and Golson (2004) explained an advantage of assessment at the classroom level is grading students' learning outcomes in a non-intrusive and systematic manner. One of the benefits of Embedded Assessment is that the instruments can be derived from assignments already planned as part of the classwork so that the time for assessment can be reduced (Ammons &Mills 2005).Embedded Assessment can be used at the subject level to help individual teacher determine to what extent learning objectives are being met, and it can be used at the program level to assist in measuring to what degree program level learning goals are being met. Embedded Assessment is not just of interest to subject teachers, but also to other program implementers and evaluators (Baker, 1994).

In Embedded Assessment, learners are assessed in the course of teaching. This could take the form of observing skills used in problem-solving, listening to learners' answers to questions and comments in order to note their difficulties and to adjust teaching accordingly. It also involves identifying possible misconceptions and taking care of it, so as not to interfere with learning as the learning progresses. Embedded assessment is a method used for measuring knowledge and ability where evaluations are part of the learning activity rather than happening after the fact (Sloane, 2000). It can be used to know how well students have understood what they have been taught. It is a quick and simple assessment tool to ask the students to do a minute paper, writes to summarize the key concept in their own words, and a natural part of the teaching and learning processes often used for assessment purposes in the classroom. (Wilson, 2000)

Traditionally, assessment activities are seen as separate from, almost an interruption to instruction. Teachers give a series of instructional activities then stop and administer an assessment, then continue with more instruction. In this assessment system, assessment tasks are part of the regular instructional activities. Assessment of students' progress and performance are integrated into the instructional processes and are indistinguishable from day-to-day classroom

activities. Since these assessments are part of the teaching and learning process, the assessments are intended to measure exactly what students are learning. (Mark &Wilson,2000)

Assessment is the essential ingredient of accountability and accountability is the key word in education today. Educators have traditionally relied on assessment that compares students with more successful peers as a means to motivate students to learn, but recent research suggests students will likely be motivated and confident learners when they experience progress and achievement, rather than the failure and defeat associated with being compared to more successful peers (Stiggins, 2001). More recently, the focus in educational policy has been on preparing all students for tomorrow's world. At the same time, the expectations for students have increased in breadth and depth, dramatically affecting teachers' instructional and assessment roles, and students' roles as learners

The growing focus on school accountability accompanied by demands that teachers must take responsibility for improving students` performance on standardized tests have made educators to search for new ways to relate classroom and periodic assessments. Although educators see assessments as a large-scale testing program conducted at institutional or state levels to determine what students have learnt in schools, Cross (1998) opined that more attention should be given to small-scale assessments conducted continuously in classrooms by subject teachers to determine what students are learning in the class. Black and Wiliam (1998) synthesized over 250 studies linking assessment and learning, and found that the intentional use of assessment in the classroom to promote learning improved student achievement.

Hansen (1993) noted that educators of students today are becoming more and more dissatisfied and frustrated with the use of standardized tests as a method of assessment. This dissatisfaction was because of the changed attitudes towards reading process and inconsistencies between how we teach and how student learn (Whang & Waters, 2001). Standardized tests have been observed as not sufficiently reflecting students' ability, but rather test for a limited set of sub-skills (Farr, 1992). The pressure of accountability has also encouraged teachers to focus their instruction on preparing their students for these tests (Elmore, 1991). This preparatory instruction (teaching the tests or teaching to the test) often has little to do with how students learn or with preparing students to effectively demonstrate the knowledge and skills they have acquired. The changing views of the learning process by scholars, and the dramatic changes in new instructional methods demand that assessments become more students centered. This calls for alternative assessments, which have been in the form of performance assessments, although other types of assessments, including projects and portfolios have been adopted in some places.

This study therefore focuses on the development and use of Embedded Assessment for teaching and learning of Geography among secondary school students. The main problem of this research is to use Embedded Assessment in the regular school system and specifically find out the extent to which this will affect students' performance in Geography.

Purpose of the Study

The purpose of the study was to develop Embedded Assessment in Geography and use it among secondary school students. Specifically, the study was aimed to find out whether:

i) embedded assessment will be effective in the teaching and learning of Geography in SS I class
ii) gender differences exist in students' performance in Geography

Hypotheses

1) There is no significant difference between performance of Geography students exposed to embedded assessment and those exposed to the traditional assessment method.

2) There is no significant effect of gender on students' performance in geography in the use of embedded assessment and traditional assessment method.
3) There is no significant interactive effect of gender and embedded assessment on students' performance in Geography

METHODOLOGY

Research Design

The design used for this study was quasi-experimental design. A quasi-experimental design is utilized where it is not possible to carry out a random assignment of subjects to experimental and control groups (Awotunde & Ugodulunwa, 2004). It is called non-equivalent or non- randomized experimental design. This is because the subjects were not randomized into groups i.e. intact classes were used. From the two schools selected, one was used as experimental group and the second one was used as the control group. The experimental group was exposed to Embedded Assessment while the control group was exposed to the traditional method of assessment.

Table 1: Quasi- Experimental design.

	Pretest	Treatment	Posttest
Experimental group	0_1	X	0_2
Control group	0_1		0_2

Key:

0_1 = Pretest
0_2 = Posttest
X = Treatment
----- = The groups were not randomly assigned.

Population

The study population consists of all public senior secondary school students in Ilorin West Local Government Area of Kwara State. The target population for this study was all the senior secondary school (SS1) students that offer geography. The target population was the students offering geography in the public senior secondary schools in Ilorin west local government area of kwara state. There are 27 public senior secondary schools in the study area, all of which are co-educational. Two schools were purposively selected out of the existing schools because of their different location this was to avoid interaction among the students.

Sample and Sampling Procedure

Two senior secondary schools were purposively selected from all the public senior secondary schools in Ilorin-west local government area of Kwara state. The sample consists of all senior secondary school one science students that offer geography in the two selected schools. These classes were selected because it was the class where vigorous academic work begins, and a solid foundation was needed to improve the general performance of the students. Intact classes were used so as not to disrupt the school arrangement. One of the schools served as the experimental group while the other school served as the control group. A total of 117 SS1 Geography students made up the sample for the study.

Table 2 :Distribution Of Students into Experimental and Control Groups

Schools	Group	Male	Female	Total
School A	Experimental	33	38	71
School B	Control	20	26	46
Total		53	64	117

Instrumentation

The experimental group was taught using Embedded assessment. In this group class work, assignments, practical exercise and quiz formed the method of assessment during the teaching and learning process. The other school, the control group was taught using conventional teaching method and assessment was done separately from the classroom teaching that is assessment was announced. Two topics in geography were taught to the students – (i) Earth Movement and (ii) Longitude and Latitude. These two topics were taught for four periods of 40 minutes each per week for period of four weeks. The instrument for pretest was made of 20 multiple choice questions which was administered to the two groups before teaching and the posttest was made of 50 multiple choice questions which was administered to the two groups after the teaching and learning has taken place. The test was tagged geography achievement test (GAT). A test-retest method of reliability was adopted on the twenty multiple choice pre-test and a reliability coefficient of 0.72 was obtained which was found to be significant at alpha level of 0.05. Through a split half method a reliability coefficient of 0.82 was obtained on the 50 multiple choice questions for the posttest.

In the experimental group, the embedded assessment was given at the end of each lesson. The assessment includes; essay questions, practical activities, calculation exercise, quizzes, assignments and class work. One question at the end of a lesson was asked which form a total number of sixteen questions. After which the posttest was administered. The scores from the tests were analysed using stannine scores and the hypotheses generated were tested using Analysis of covariance(ANCOVA).The purpose was to correct for initial differences that might have occurred in the two groups since randomization was not carried out.

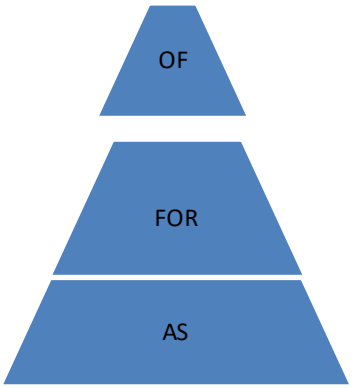
THEORETICAL FRAMEWORK

Purpose of Assessment is to improve student learning. This comes with three assessment models.

Assessment of Learning

Assessment for Learning

Assessment as Learning



Assessment learning

Assessment of Learning (AoL)

The process of collecting and interpreting evidence for the purpose of summarizing learning at a given point in time, to make judgments about the quality of student learning on the basis of established criteria, and to assign a value to represent that quality. (Earl, 2003)

Assessment for Learning (AfL)

The ongoing process of gathering and interpreting evidence about student learning for the purpose of determining where students are in their learning, where they need to go, and how best to get there. (Earl,2003) Assessment for learning occurs when teachers use inferences about student progress to inform their teaching.

Assessment As learning (AAL)

Assessment as learning focuses on the role of the student as the critical connector between assessment and learning. The process of developing and supporting student metacognition (knowledge of one's own thought processes). Students are actively engaged in the assessment process; that is, they monitor their own learning. (Earl, 2003)

Through this process students are able to learn about themselves as learners and become aware of how they learn – become metacognitive. When students develop learning goals, think reflectively, self-monitor their learning it is Assessment AS Learning

RESULTS

Research question 1: will embedded assessment be effective in the teaching and learning of Geography in SS I Class?

Table 3:Analysis of experimental and control group performances

Groups Gender	Mean	Std. Deviation	N
Experimental group	31.06	5.33	33
Male	31.87	6.15	38
Female	31.49	5.76	71
Total			
Control group			
Male	20.30	4.11	20
Female	20.35	4.09	26
Total	20.33	4.05	46

Table 3 shows that the mean score of experimental and control group of geography students taught with embedded assessment and traditional assessment method was 31.49 and 20.33 respectively. This result showed that embedded assessment had significant effect on students' performance in geography. Students taught with embedded assessment performed better than the students taught with traditional assessment method.

Research question 2: Does gender difference exist in students' performance in Geography?

Table 4: analysis of male and female performances

Groups gender	mean	Std. Deviation	N
Male	27.00	7.14	53
Female	27.19	7.84	64
Total	27.10	7.51	117

Table 4 shows that the total mean scores for male was 27.00 while the total mean score for female was 27.19 this means that there is no difference in the male and female student performance in geography.

Hypotheses testing

Hypothesis 1

$H0_1$: *There is no significant difference between performance of Geography students exposed to embedded assessment and those exposed to the traditional assessment method*

Table5: ANCOVA Result of Embedded Assessment and Traditional Assessment

Source	Type III sum of square	Df	Mean square	Calculated F-value	Sig
Group	4139.797	1		200.766	.000
Total	92483.000	117	10.835		
Corrected total	6540.769	116	5.688		

Table 5 shows that the calculated F-value is 200.766 while the F-significance is .000 with 1 and 116 degrees of freedom and at level of significance 0.05.Since the calculated F-value is greater than the critical F-significance, $H0_1$ is hereby rejected and the alternative hypothesis accepted.

H_1: *There is a significant difference between performances of geography students exposed to embedded assessment and Traditional method of Assessment.*

Hypothesis 2.

H_{02}: *There is no significant effect of gender on students' performance in geography in the use of embedded assessment and traditional assessment method.*

Table 6: ANCOVA Result on effect of gender on students' performance

Source	Type III sum of square	Df	Mean square	Calculated F-value	Sig.
Gender	10.835	1	738.866	.525	.470

Table 6 shows that the F- significant of .470 was derived and this is greater than the p-value 0.05 it is on this basis that the null hypothesis was accepted while the alternative hypothesis was rejected.

H_2: *There is no significant effect of gender on students' performance in geography in the use of embedded assessment and traditional assessment method.*

Hypothesis 3

H_{03}: *There is no significant interactive effect of gender and embedded assessment on students' performance in Geography*

Table 7: ANCOVA Result on interactive effect of gender and embedded assessment

Source	Type III sum of square	Df	Mean square	Calculated F-value	Sig.
Groups*gender	5.688	1	4139.797	.276	.600

*stands for group interactive effect

Table 7 shows that the F- significant of .600 was derived and this is greater than the p-value 0.05 based on this, the null hypothesis was retained while the alternative hypothesis is rejected.

H_3: *There is no significant interactive effect of gender and embedded assessment on students' performance in Geography*

Discussion of Findings

Findings from the study showed that students exposed to embedded assessment had significant performance in geography when compared with the control group because the mean obtained from the experimental group was 31.49 while the mean obtained from the control group was 20.33. The findings from this study support the work of Ezeudu (2014) who stated that reflective inquiry method was a significant factor in students' achievement in Geography as its increased students' achievement in geography more than the lecture method of teaching. This indicated that method of teaching has a lot to do with students' achievement in Geography. The improved achievement of students in the experimental groups may be as a result of many factors. One of such factors according to Lyons (2010) is making learning an active process, where the learner is totally immersed in learning activities which appeals to him. Also, during the lesson, the students feel relaxed as teaching and learning unfolds as assessment is unannounced so anxiety that comes with test writing was eliminated.

Findings also showed that gender difference does not exist in students' performance in Geography. This finding supports the work of Okorie and Ezeh (2016) showed that gender, has no significant effect on students' achievement in chemical bonding. This implies that gender is not a significant factor in students' achievement in chemical bonding therefore, gender has no effect on students' performance in geography.

CONCLUSION

The study was carried out to explore the effect of Embedded Assessment on secondary school student performance in Geography. The result of the study shows among others that the Embedded Assessment was valid and reliable. Proper implementation of Embedded assessment should be done with particular attention to reducing poor students' performance in geography and eradicate examination malpractice among secondary school students. It is important now more than before that geography teachers should utilize all avenues of embedded assessment as complementary approach to instruction so as to attain the desired performance level in geography as stipulated in the National Policy on Education (NPE).

Recommendations

The topics in the curriculum should be taught in such a way as to bring out the potentialities in learners by teaching for understanding and guiding students to improve their performance in Geography. This could be done by making sure that topical contents and behavioural objectives covered are well expressed.

Teachers should incorporate Embedded Assessment into their regular classroom instruction for teaching and learning. Embedded assessment will help to make learning easy and more meaningful. Teachers should embark on assessment of students' academic performance for mastery purpose. This is because mastery learning provides opportunities for most students to master what they are taught through the process of formulating instructional objectives. In diagnosis, the individual learner's specific problems and that of the class as a whole are detected to avoid them from interfering with learning.

Finally, both the government and teachers should support the integration of Embedded assessment into our school curriculum as alternative assessment to traditional method of assessment.

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