Current Status Of Science Teacher’s Practice Of School Based Assessment In Secondary Schools: Implications For Educational Reforms In Nigeria

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Abstract: The study investigated the current status of Science Teachers’ Practice of School-Based Assessment in Secondary Schools of Kafanchan Education Inspectorate Zone, Kaduna State, Nigeria. Descriptive survey design was adopted for the study. Purposive sampling technique was employed to select a sample of 39 secondary schools offering Biology, Physics and Chemistry and 169 Science teachers’ teaching Biology, Physics and Chemistry in those sampled schools. Two research questions and two hypotheses were answered and tested respectively using the data collected from the one instrument - Science Teachers Practice of School-Based Assessment Practice (STPSBA). Frequency count, Mean and Standard deviation were used to analyze the data collected to answer research questions and t-test for independent samples. Analyses of Variance (ANOVA) were employed to test the hypotheses. The findings of this study revealed that private school science teachers found to be using school based assessment appropriately than their counterparts in public schools. Equally, it was revealed that suitability of the practice of school based assessment in Biology, Physics and Chemistry by the science teachers do not differ significantly. There was also evidenced to establish the fact that there was a significant difference between science teachers in private schools and public schools in their practice of school based assessment. Also, that there is no significant difference between Biology, Physics and Chemistry teachers in their practice of school based assessment in secondary schools. The study further recommended that for the school based assessment to be effectively employed in secondary school, science teachers in both private and public schools should be trained in form of workshops and seminars in order to acquire more knowledge in the use of varieties of school based assessment strategies.

Keywords: Science education teacher, School Based Assessment, Practice, Reform

I. INTRODUCTION

Many countries in the world including Nigeria has recognize science education as the major tool for effective national development. No doubt, science education is the key that opens the keys of modernization and globalization. This has to be backed up by the desired efforts and determination on the part of the science teacher before the national development could be attained. In Nigeria the science teacher is saddled with this responsibility of given quality teaching and learning for the citizens. Lassa (2005) further reinstated that, teachers are the major determinant of quality education, if they are apathetic, uncommitted, uninspired, lazy, and ignorant in their discipline and teach wrong information; they are not only useless but dangerous.

There are times when educational, economic, social and political dimensions of a country change, and since educational system of any country affects every segment of the nation development, its policies would have to be reviewed. This often necessitates the reform in educational system. For instance the ongoing assessment reforms in Nigeria Educational system particularly at Secondary School known as School Based Assessment. This assessment reform is generated in a variety of ways to improve teaching and
learning and also to enhance the likelihood of success by both the learners and the teachers. 

NTI( 2006) defined School Based Assessment as “an assessment practice that involves not only the subject teachers but the child himself , peer group, parents, other teachers and all the relevant educational agencies(inspectors, supervisors) in the learning process in some formal and informal ways.”

All these categories of people are incorporated into the assessment process to support, motivate and enable the child to want to learn, to actually learn and to steadily make learning progress. NTI (2006) also identified some benefit of the ongoing School Based Assessment reform:

- permit the child to receive support from many sources;
- permit the learner to participate actively in his/her own assessment;
- make other relevant person feel important and to be involved in the child learning;
- give pupils wider opportunities to express what they have learnt; and
- Provides credible evidence of the child’s learning experience.

Equally, apart from involving more people in school-based assessment process, written test in it different formats still play a prominent role, more attention given in school based assessment to assignments, home work, projects, group work, practical work and portfolios. All the elements of continuous assessment such as planning, consideration, previous assessment, providing pupils prompt feedback and use of variety of tests(oral, written and performance) are all incorporated into the ongoing School Based Assessment reforms.(NTI,2006)

In view of this, it is clearly shown that School-Based Assessment in Nigeria Educational system is a thing of concern to all stakeholders in education especially the teachers and others which includes parents, peer group of the learner, school administrators and learners themselves. This probably explains why Hassan (2001) argued that teachers are the main implementers of a country’s educational policies.

Despite the importance of school based assessment, it has been subjected to a great deal of abuse and misinterpretations by the science teachers because many teachers in secondary schools appear not to understand the rational for School-Based Assessment (Gulee, 2015).It is observed also that, teachers have misinterpreted the policy of School-Based Assessment to mean administration of monthly and bi-weekly tests in the cognitive domain which deviated from School-Based Assessment policy guidelines(NTI,2006). These are problems that need to be addressed in order to enhance the quality of learning and teaching in secondary schools

Science education in Nigeria encompassed three core subjects, namely Biology, chemistry and physics which combined with education and over the years these has been poor academic performance of these subjects as observed by WAEC Report,2011-2015

<table>
<thead>
<tr>
<th>Year</th>
<th>Biology</th>
<th>Chemistry</th>
<th>Physics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% pass A1-C6</td>
<td>% pass A1-C6</td>
<td>% pass A1-C6</td>
</tr>
<tr>
<td>2011</td>
<td>34.93</td>
<td>50.94</td>
<td>44.91</td>
</tr>
<tr>
<td>2012</td>
<td>34.93</td>
<td>50.94</td>
<td>44.91</td>
</tr>
<tr>
<td>2013</td>
<td>34.93</td>
<td>50.94</td>
<td>44.91</td>
</tr>
<tr>
<td>2014</td>
<td>34.93</td>
<td>50.94</td>
<td>44.91</td>
</tr>
<tr>
<td>2015</td>
<td>34.93</td>
<td>50.94</td>
<td>44.91</td>
</tr>
</tbody>
</table>

Source: WAEC office Yaba Lagos

Table 1: Enrollment and performance of student in Biology, chemistry and physics in WAEC from 201 – 2015

It is clearly shown here that the academic performance of students in these three science subjects in Nigeria is poor. This is supported by Amuche (2008) which opined that, the poor performances perhaps is as a result proper orientations on the new reforms in science education.

Research report from the previous studies on School-Based Assessment in Nigeria (Banda,2005; Oboma,2008; Esere and Idowu,2010) have tended to focus on practices of School Based Assessment whose result have little implications because of the generality of the populace used for their studies. They way school-based assessment is conducted in non-science subjects is different from science discipline. Therefore, this study concerns about the current status of science teachers’ practice of school-based assessment in core science subjects (Biology, Chemistry and Physics) particularly in secondary schools

STATEMENT OF THE PROBLEM

The present researcher’s experience as a science teacher who had taught in public and private secondary schools for the past few years shows reason to worry about the way school based-assessment has been implemented in secondary schools especially in teaching science core subjects. This observation is corroborated by the findings of National Teacher’s Institute (NTI, 2006) that school based assessment has been subjected to great deal of abuse by the teachers.

It is also very clear from the poor performances of Biology, Chemistry and Physics students in Senior Secondary School Certificate Examination of the past twelve years (2012-2015 years) as indicated by the WAEC report. This view is further supported by the research findings of Amuche(2008)which has revealed that student’s poor performance in the WAEC Examination is as a result of ineffective teaching which is likely to be inappropriate use of assessment in schools by teachers.

It is based on this background, one begins to wander whether secondary school science teacher’s have adequate knowledge of School Based Assessment. One also wanders what science teachers do in their practice of School Based Assessment. It thus becomes necessary to find out the state of secondary school science teacher’s practice in the implementation of School Based Assessment (SBA)

Additionally, science teachers of different subject’s areas may have different levels of knowledge of the implementation of school based assessment. It is therefore, important to find out the status of the practice of school based assessment of science teachers of different areas of specialization. In the same way, teachers of schools are usually influenced by the type of school management under which they work. It is therefore possible that teachers’ practice of School Based Assessment is influenced by the school proprietorship. This study therefore, investigated the influence of school proprietorship on the teachers’ practice of School Based Assessment in Kafanchan Education Inspectorate zone, Kaduna State, Nigeria.
PURPOSE OF THE STUDY

The general purpose of this study is to find out the current status of science teachers practice of school-based assessment in secondary schools of Kafanchan Educational Inspectorate Zone, Kaduna State, Nigeria. In specific terms this is intended to:

✓ Find out the school-based assessment practices employed by school Proprietors in secondary schools (Public and private schools)
✓ To find out the extent to which science teachers’ differ in their practice of school based assessment by their subject area of specialization in secondary schools.

RESEARCH QUESTIONS

In this study, the following questions are formulated to guide the study:

✓ What is the suitability of the science teacher’s practice of school-based assessment by Secondary Schools proprietorship?
✓ To what extent is the science teacher’s differ in their practice of school-based assessment by their subject area of specialization in Secondary Schools?

STATEMENT OF HYPOTHESES

✓ There is no significant difference between public and private schools science teacher in their mean score on practice of school based assessment.
✓ The teachers do not differ significantly in their mean score on the practice of school based assessment by their subject area of specialization.

II. RESEARCH METHODOLOGY

A. RESEARCH DESIGN

In this study, descriptive survey design was adopted; this is because the method sought opinions from a representative sample of the population on their current practices of science teachers regarding the use of school-based assessment in secondary schools. This design was adopted also because it will enhance the generalization of the findings of the study.

B. POPULATION/SAMPLE OF THE STUDY

The population for the study consisted of 450 science teachers in all the 61 secondary schools in Kafanchan Educational Inspectorate Zone, Kaduna State, Nigeria (breakdown of this population gives 67 Biology teachers, 44 physics teachers, 58 chemistry teachers, 40 mathematics teachers, 49 Integrated science teachers, 89 Agriculture Science teachers, 20 computer science teachers, 40 introductory technology teachers and 43 Physical and Health Education teachers) This statistics is from a source: Ministry of Education Kaduna State, Kafanchan Educational Inspectorate Zone Statistics as at January, 2016.

For the purpose of this study, a total of 169 science teachers teaching Biology, Physics and Chemistry participated in the study were selected through purposive sampling technique from the 39 secondary schools offering Biology, Physics and Chemistry as the subject in Kafanchan Inspectorate Zone (28 public and 11 privates schools) these schools were selected in the basis of the following:

✓ The schools offering either or all Biology, Physics and Chemistry as a subject.
✓ The schools that have either or all Biology, Physics and Chemistry teachers teaching the subject or subjects.

Out of the schools that met these criteria, 39 schools were selected through purposive sampling technique. In each of these schools all the subjects teachers teaching Biology, Physics and Chemistry were all used in each of this school as the sample unit which constituted the total of 169 science teachers for the sample of this study.

C. INSTRUMENTATION

Science Teacher’s Inventory for School Based Assessment Practice (STISBAP) was developed by the researcher and used to collect information from teachers with regards to the practices of school-based assessment guidelines in the respective study schools. In developing the instrument, literature search was undertaken to identify the issue involved in the practices of school-based assessment guidelines. The studies of Obioma (2008), NTI (2006); Esere & Idowu (2010) were found to be very useful in this regard. The issues identified from these previous studies formed the basis on which the inventory was developed. A total of 31 items of inventory was subjected to validation to ensure face validity of the instrument using experienced science educators and measurement and evaluation experts. A final version of the instrument was arrived at after a consideration of the entire ranking with 0.92(92%) index of logical validity.

The instrument (STISBAP) is made up of sections A, B and C. Section A. solicits information about the teachers’ qualification, Type of schools he/she teaches (public or private), Area of specialization. Section B. had 13 statements (yes or No) covering the School Based Assessment guidelines procedure, as it is in the Nigeria National Policy on Education. While Section C. had 12 statements covering the types of School Based Assessment strategies being used by the science teachers in secondary schools and to what extent is it applicable.

However, the reliability of the instrument was conducted which led to the internal consistent of 0.80. This shows that the instrument is good and reliable.

D. ADMINISTRATION

Permission was sought from the principals of the secondary schools for the use of the schools’ science teachers. Each school was visited by the researcher and personally administered the instrument to the science teachers to collect data with regards to their practice of school-based assessment in the respective sampled schools. The teachers were instructed on how to complete the questionnaires to ensure that mistakes are not made. The science teachers of other
exclusive subjects of the respective schools served as research assistant to help the researcher. The researcher later collected the sample of some tests administered by the teacher to verify teachers’ response to the questionnaire.

E. PROCEDURE FOR DATA ANALYSIS

Research question one and two data obtained were analyzed using simple frequency counts, means and standard deviations to present the expressed opinions of science teachers on school-based assessment practice. This is because analyzed procedure was necessary by the descriptive survey nature of the study.

Also, the mean difference of the public and private schools science teachers in their practice of school based assessment were tested for significance using t-test statistics for independent sample. Also, the mean score difference of science teachers on their practice of school based assessment in their Area of specialization (Biology, Chemistry and Physics) were tested for significance using ANOVA statistics.

III. RESULTS AND INTERPRETATION

RESEARCH QUESTION 1: What is the suitability of science teacher’s practice of school-based assessment by secondary school proprietorship?

To analyze this research question, descriptive statistics were computed.

<table>
<thead>
<tr>
<th>Group</th>
<th>Number</th>
<th>Mean</th>
<th>S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public School</td>
<td>129</td>
<td>71</td>
<td>25.18</td>
</tr>
<tr>
<td>Private School</td>
<td>40</td>
<td>73</td>
<td>31.98</td>
</tr>
<tr>
<td>Total</td>
<td>169</td>
<td>144</td>
<td>57.16</td>
</tr>
</tbody>
</table>

Table 1: Mean Score and Standard Deviation of Science Teachers on Practice of School Based Assessment by School Proprietorship

Table 1 shows that the Private school science teachers displayed suitable practice of school based assessment (M=73,SD=31.98) than the Public school science teachers(M=71,SD=25.18).It is obvious that both mean and standard deviation of the Private school science teachers are greater than that of the Public school science teachers. This implies that private school teachers have a more suitable school-based assessment practice than their counterparts in public school science teachers.

RESEARCH QUESTION 2: To what extent do science teachers’ differ in their practice of school-based assessment by subject area of specialization in secondary school?

To analyze this research question, descriptive statistics were computed.

<table>
<thead>
<tr>
<th>Group</th>
<th>Count</th>
<th>Mean</th>
<th>S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>67</td>
<td>69</td>
<td>28.33</td>
</tr>
<tr>
<td>Physics</td>
<td>44</td>
<td>64</td>
<td>23.25</td>
</tr>
<tr>
<td>Chemistry</td>
<td>58</td>
<td>67</td>
<td>26.26</td>
</tr>
<tr>
<td>Total</td>
<td>169</td>
<td>200</td>
<td>77.84</td>
</tr>
</tbody>
</table>

Table 2: Mean Scores, Standard Deviation Scores of Teachers’ Practice of School Based Assessment by Subjects Area of Specialization

Table 2 shows that science teachers of Biology, Physics and Chemistry have the same status of suitability of the practice of school based assessment (M=69, SD=28.33; M=64,SD=23.25; M=67,SD=26.26)respectively. It is obvious that the means and standard deviations of biology, physics and chemistry teachers’ practice of school-based assessment ranges with the same limit. This implies that biology, physics and chemistry teachers’ practice of school-based assessment do not differ significantly. The findings reveals that Biology, physics and chemistry teachers have the same status of practicing school based assessment in their schools.

HYPOTHESIS 1

There is no significant difference in the mean score between public and private school science teachers in their practice of school-based assessment.

To test this hypothesis, t-test of significance was used and the descriptive statistics were computed.

<table>
<thead>
<tr>
<th>Group</th>
<th>Number</th>
<th>Mean</th>
<th>S.D</th>
<th>DF</th>
<th>t-cal</th>
<th>t-tab</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public School</td>
<td>129</td>
<td>71</td>
<td>25.18</td>
<td>167</td>
<td>4.12</td>
<td>1.65</td>
<td>H3 Rejected</td>
</tr>
<tr>
<td>Private School</td>
<td>40</td>
<td>73</td>
<td>31.98</td>
<td>73</td>
<td>4.12</td>
<td>1.65</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: t-test of Significant Difference in the Mean Scores on Science Teachers Practice of School Based Assessment by School Proprietorship

Table 3 shows the Mean Score of Public school science teachers and Mean Score of Private school science teachers’ practice of school based assessment as 71 and 73. Furthermore, at 0.05 level of significance and degree of freedom of 168, the t-test value is 4.12 which are greater than the critical value of 1.65 was obtained. Since the calculated value of t-test is greater than its critical value, the null hypothesis is therefore rejected. Hence, there is significant difference between public and private school science teachers in their practice of school-based assessment.

HYPOTHESIS 2

The science teachers do not differ in their mean scores on practice of school-based assessment in their area of specializations.

In order to test this hypothesis, One-way ANOVA (F-test) was used and the descriptive statistics were computed.

<table>
<thead>
<tr>
<th>Group</th>
<th>Count</th>
<th>Mean</th>
<th>S.D</th>
<th>DF</th>
<th>F-cal</th>
<th>F-tab</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology-TKSBA</td>
<td>67</td>
<td>69</td>
<td>28.33</td>
<td>66</td>
<td>2.87</td>
<td>3.00</td>
<td>H6 Not rejected</td>
</tr>
<tr>
<td>Physics-TKSBA</td>
<td>44</td>
<td>64</td>
<td>23.25</td>
<td>66</td>
<td>2.87</td>
<td>3.00</td>
<td>H6 Not rejected</td>
</tr>
<tr>
<td>Chemistry-TKSBA</td>
<td>58</td>
<td>67</td>
<td>26.26</td>
<td>66</td>
<td>2.87</td>
<td>3.00</td>
<td>H6 Not rejected</td>
</tr>
</tbody>
</table>

Table 4: F-test of Significant Difference in the Mean Scores on Science Teachers Practice of School Based Assessment by Subject Area of Specialization

Table 12 shows the Mean Scores of Biology, Physics and Chemistry Teachers’ Practice of School-based assessment as 69, 64 and 67 respectively. Furthermore, at 0.05 level of significant and degree of freedom of 168, the F–test value is 2.87 which are less than the critical value of 3.00 was obtained. Since the calculated value of F–test is less than its critical value, the null hypothesis is therefore accepted. Hence, the teachers do not differ in their mean scores on the practice of school-based assessment in their areas of specialization.
A. IMPLICATIONS OF SCIENCE TEACHERS’ PREPARATION TO EDUCATIONAL REFORMS IN NIGERIA

The science teachers at secondary school level of education in Nigeria are the foundation builders, springboard, and pivotal to Science, Technology, Engineering. This is the stage that gives birth to all intellectual process of early concept development in every area of specialization. It is therefore apparent that, secondary science teachers play vital roles in the teaching and learning of science and mathematics at level of education. This is the level where greatest efforts are required by all stakeholders in education. The pre-service science teachers need to be adequately equipped professionally, in terms of experience, qualification and capability to teach science at secondary school.

The current secondary school science teachers in Nigeria have many challenges that have rendered them ineffective in their job. This ranges from inadequate number of qualified science teachers, poor attitude to their job, lack of mastery of the science content they teach, and poor methods of teaching. These problems need to be addressed immediately, before any educational reforms can succeed. This requires serious intervention programmes.

In view of the fact that, teachers are the product of education system and through them education reform is visible, so in any education reform, teachers need to be involved in programme planning, failure of, which the reform will definitely not succeed, Teachers are the implementers of any new education programme.

Science education has been described variously as the heart of the concept of basic science. Science education is indispensable and is considered not only important in its right as a field of study and research, but much more also essential to almost every field of study in intellectual pursuit. For example, modern exploit in science such as in medicine, communication, Biotechnology, transportation among others are the products of knowledge acquire from science education either in primary science or secondary science. Modern science wouldn’t have been possible without science education.

Furthermore, enough number of scientist and engineers required in modern workforce are extremely important to every nation’s economic strength and progress in technology. Essentially, science education is a firm necessary foundation requirement for the development and advancement in science and technology. Science teachers at the secondary school level of education are the ones who lay the foundations of science knowledge required for scientific, economic and technological advancement of every society.

B. RECOMMENDATION

The following recommendations are put forward in this study:

- Science teachers in public and private schools should use school-based assessment in order to elicit information on the various attribution possessed by an individual.
- Science teachers in both public and private school should develop positive attitude towards the implementation of school based assessment Practice. when positive attitude is developed, then the teachers will be committed to the process which will enhance efficiency of the process.

- Science teachers should be committed to the use of school-based assessment on a regular basis. As the name suggests, the assessment should be done frequently.
- Building capacity of science teachers to improve their school-based assessment practices should be a priority of the government, if learning of science has to be meaningful. Nigeria must realize that improving education standards goes beyond effective management of external examinations (WAEC or NECO), construction of school buildings, availability of teachers and book. It includes good classroom practices of which assessment of students using appropriate is a critical aspect.

The survey reveals that school-based assessment varied across schools (public and private schools). There is need to include and integrate assessment practices into teacher educational programme in teacher training institutes.

REFERENCES