



IMPROVING POLICY AND ENHANCING PERFORMANCE FOR QUALITY AND ACCOUNTABILITY IN SCIENCE EDUCATION

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ABSTRACT

The paper Improving Policy and Enhancing Performance for Quality and Accountability in Science Education was informed by the apparent decline in the quality of education and degeneration in the accountability and performance of science educational instructors in Nigerian Higher Institutions. While the research question addresses issues pertaining Quality and Accountability in science education, it includes policies that can be used to enhance performance of educators in Science Education in Nigerian Higher Institutions. Two hypotheses were formulated to guide the study, and Forty six respondents (educators) were selected at random from 6 Higher Institutions (3 Universities and 3 Colleges of Education) in Delta State. An internal consistency with a coefficient of 0.84 was attained using the Cronbach alpha method. Arithmetic mean and Pearson Correlation statistics were used to test the research questions and hypotheses. The study revealed that Re-vamping administration processes, Re-Structuring admission exercises and examination processes, abolishing the one-size-fits-all dogmatic methods of administering exams were some areas that can be improve quality and accountability. The study also revealed that as the Quality, Accountability, and enhanced performance of administrators in Science Education increases, so also does the Improvement of administrative processes in science education in Nigerian Higher Institutions.

Keywords: Accountability, science education, quality, policy, administration

INTRODUCTION

As the educational sector in Nigeria begins to receive impetus from educational bodies such as Universal Basic Education (UBE), Higher Education, and Tertiary Education Trust Fund (*TETFund*), the stage is now set for Quality and Accountability in the system. The concept, Quality and Accountability is a contemporary issue described as “the twin sides of the coin” in the educational sector in Nigeria, which attempts to measure the individual and the institution in terms of the Quality of the educational institution, and the level of legal responsibility with regards to proper financial standing ensuring transparency and credibility. The concept of Quality and Accountability originated in the United States of America and the United Kingdom in the 1980’s during the times of former President Ronald Ragan when attempts were made to measure the performance of individuals occupying public offices and their level of excellence.

Quality in Science Education

The perception of Education in itself is a complex process and by this very nature, it becomes difficult to define its quality based on its derivative context. The British Standard Institution (BSI) defines quality as “the totality of features and characteristics of a product or service that bear on its ability to satisfy or implied needs” (BSI, 1991). Quality as a process suggests that in order to achieve quality of a product or service, it must undergo certain processes and conform to the procedural requirements (Mishra, 2006). The quality of education therefore, according to UNICEF (2000), includes; Learners who are healthy, well-nourished and ready to participate and learn, and supported in learning by their families and communities; Environments that are healthy, safe, protective and gender-sensitive, and provide adequate resources and facilities; Content that is reflected in relevant curricula and materials for the acquisition of basic skills, especially in the areas of literacy, numeracy and skills for life, and knowledge in such areas as gender, health, nutrition, HIV/AIDS prevention and peace; Processes through which trained teachers use child-centred teaching approaches in well-managed classrooms and schools and skillful assessment to

facilitate learning and reduce disparities; outcomes that encompass knowledge, skills and attitudes, and are linked to national goals for education and positive participation in society.

Gospodinov (2009) asserts that a problem in defining the quality of education arises when one chooses the aspect of education that will be the focus of attention. Since education has many purposes and components, questions regarding quality may reasonably be posed about any important aspect of a system: infrastructure, school buildings, administration, teacher training, educational materials, teaching or achievements. All these elements... are interrelated, and a serious deficit in one is likely to have implications for quality of others (Kellaghan, & Greaney, 2001). Against this backdrop, quality in science education is defined as the conglomeration of a robust curriculum that addresses current social trends in the sciences taught in a conducive environment with adequate scientific apparatus by qualified science instructors. It is an expression of the level of consistency, and excellence in achieving scientific educational attainment or awareness, based on the performance of the student in relation to the funds used in acquiring such knowledge. Hanushek et al. (2011), opined that its essence “is to identify a set of clear, measurable, and ambitious performance standards for students across a number of core subject areas, to align curriculum to these standards, and to expect students to meet these high standards”.

Accountability in Science Education

Accountability, a phrase commonly used in public offices connoting trust of stewardship with regards to the utilization of resources allocated for a particular purpose. It saddles upon the bearer the responsibility or task of reporting an activity or event to others, connoting “that anyone managing an organization should be responsible and ready to give periodic account of how effective and efficient the system had performed over a given period of time” (Durosaro, 1998). The term accountability, as it is commonly used in higher education, includes a range of policy issues, not all of which are related to student outcomes. As a general policy construct, the term refers to the responsibility (if not legal obligation) of campus and system administrators, as well as governmental officials, to provide their supervisors (ultimately, the public) reports of their stewardship (Leveille, 2006). Accountability in science education therefore in specific terms refers to the responsibility of educators to administer a certified curriculum in the sciences in a systematic manner to promote educational achievement with an aim to impact absolute competence and proficiency upon other folks in the discipline.

In Nigeria, to aid the control of the educational system, the Government handed down a national policy on education which specifies the structure, curricula, goals and objectives of the various sub-systems. The concept of accountability thus implies that those engaged in operationalizing the system should constantly evaluate and demonstrate that the resources in terms of human, material and physical facilities, devoted to education are being properly utilized to achieve such stated goals (Durosaro, 1998). In this 'age of accountability,' administrators and others have been especially concerned about educational outcomes and their measurement. Postsecondary institutions are also being called on to provide factual evidence that they and their programs are providing the benefits that were intended, and that these outcomes are being produced in a cost-effective manner (Lenning, 1977).

Statement of the problem

In the Nigeria, the soaring number of student's intake into higher educational institutions does not seem to match the number of lecturers nor the adequacy of lecture materials used. Summoning the words of Aiyemenkhue (2011), “Nigeria's education system is rather quantitative than qualitative-oriented; the quality education for our people and country; is plagued with numerous social vices”, as our educational institutions are now profit oriented, and more emphasis being placed on Internal Generated Revenue (IGR) instead of quality and accountability in the system. As Leveille (2006) rightly stated that Colleges and Universities ‘are’ more concerned about growth and diversity as they were increasingly held accountable for the effectiveness and efficiency of the educational enterprise. While primarily centered on financial concerns, the value of higher education outcomes were increasingly called into question. The cost, in terms of funding and financing of the system, goes up; class sizes increase and, as to be expected, quality of learning goes down (Bamiro 2012).

Objectives of the study

The primary objective of this study was to establish Quality and Accountability in Science Education Improving Policy, Enhancing Performance. Other objectives include the following;

1. To determine how the Quality of Science Education could be improved.
2. To Search out ways of improving Accountability in Science Education administration.
3. To emphasize on the need for performance policy formulation and enhancement of administrative process in science education.

Research Question

1. What can be done to improve the Quality of science education in Nigerian Higher Institutions?
2. In what ways can Accountability in Science Education administrators be improved?
3. What policies can be used to enhance performance of administrative process in Science Education?

Research Hypothesis

Ho₁ – There is no significant relationship between Quality and the improvement of administrative processes in science education in Nigerian Higher Institutions.

Ho₂ – There is no significant relationship between Accountability and the improvement of administrative processes in science education in Nigerian Higher Institutions.

Ho₃ – There is no significant relationship between enhanced performance of science education administrators and the improvement of administrative processes in science education in Nigerian Higher Institutions.

METHODOLOGY

The paper employs a descriptive survey design consisting of 46 Lecturers from the Faculty of Science and Education respectively from 6 Higher Institutions (3 Universities and 3 Colleges of Education) in Delta State, based on convenient sampling using a systematic random sampling technique. The instrument developed for data collection was an 18 item questionnaire designed to reveal the respondent's opinion on the Quality and Accountability in Science Education, Improving Policy and Enhancing Performance. A four point scale of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD) was employed. The instrument was validated by two experts from both Faculties. An internal consistency with a coefficient of 0.84 was derived using the Cronbach alpha method. An arithmetic mean was used to answer the research questions, with an arbitrary mean value of 2.5 assigned, indicating that all variables below 2.5 are negative (Disagree) while all variables above 2.5 are positive (Agree). The research hypothesis was tested using a t test statistics at 0.05 level of significance.

RESULTS

The results were obtained from the research question and hypotheses tested and shown below;

RQ1: *What can be done to improve the Quality of science education in Nigerian Higher Institutions?*

The Table 1 revealed the result of all items obtained a score that is above the arbitrary 2.50 mean, indicating that all items were accepted by the respondents as areas in which the quality of science education can be improved if adhered to in Nigerian Higher Institutions. This was further confirmed by the cluster mean of 2.856 ± 0.961 , which is also higher than the arbitrary mean of 2.50.

Table 1: Respondent's Mean rating on what can be done to improve the Quality of science education in Nigerian Higher Institutions

S/N	Item	N	SA	A	D	SD	Mean	SD
1.	Re-vamping the Administration processes used in Nigerian Higher Institutions	46	14	9	18	5	2.696	1.030
2.	Re-Structuring Admission processes/exercises and examination processes	46	12	16	11	7	2.717	1.026
3.	Abolishing the one-size-fits-all dogmatic methods of administering exams	46	10	15	17	4	2.674	0.910
4.	Re-visiting and improving lecture methodologies	46	12	13	11	10	2.587	1.095
5.	Reducing the apparent gap between student and lecturers in terms of knowledge and intellectual transference	46	19	11	9	6	2.956	1.074
6.	Reducing class size	46	16	10	13	7	2.761	1.087
7.	Increasing student accessibility to lecturers	46	9	16	11	9	2.556	1.023
8.	Improving infrastructural facilities	46	28	17	1	0	3.587	0.535
9.	Developing more conducive learning environments	46	11	18	9	8	2.696	1.019
10.	Introducing Audio/visual multimedia teaching/learning aids	46	24	14	7	1	3.326	0.809
Cluster Mean							2.856	0.961

RQ2: *In what ways can Accountability in Science Education administrators be improved?*

Table 2: Respondent's Mean rating on ways that Accountability in Science Education administrators can be improved

S/N	Item	N	SA	A	D	SD	Mean	SD
11.	Enforcing laws that restricts lecturers from taking undue advantage of students	46	7	19	14	6	2.587	0.899
12.	Increasing the number of non-academic staff in a department/faculty for ease of administration processes	46	12	13	12	9	2.609	1.073
13.	Assigning each student to a non-academic staff to ease the burden of administration for ease of registration/retrieval of results	46	16	11	9	10	2.717	1.155
14.	Assigning students to lecturers to increase student/lecturer contact in similar manner as when assigning students to their respective project supervisors for ease of exam supervision	46	6	19	14	7	2.522	0.903
Cluster Mean							2.609	1.081

Table 2 also followed similar paradigm, which revealed that all the items /variables listed in the table (Table 2) obtained a score that is above the arbitrary 2.50 mean, also showing the respondents agreed that

the above areas are ways that Accountability in Science Education administrators can be improved also if complied to in Nigerian higher Institutions. Furthermore, the cluster mean of 2.609 ± 1.081 , confirms the above since its mean score was also higher than the arbitrary mean of 2.50.

RQ3: *What policies can be used to enhance performance of administrative process in Science Education?*

Table 3: Respondent’s Mean rating on what policies can be used to enhance performance of administrative process in Science Education

S/N	Item	N	SA	A	D	SD	Mean	SD
15.	Introducing staff training for the non-academic staff cadre	46	12	18	9	7	2.761	1.004
16.	Introducing quarterly, bi-annually, or annual assessment of teaching styles/methods used by lecturers	46	9	16	13	8	2.565	0.992
17.	Training lecturers on administrative skills	46	23	9	11	3	3.13	0.991
18.	Training lecturers to improve their lecturer/student social skills following the Universal Principle of “the-customer-is-king” as obtained in other business practices	46	8	19	7	12	2.50	1.058
Cluster Mean							2.739	0.283

The Table 3 above showed result of items/ variables 15 – 17, scoring above the arbitrary mean of 2.50, and item/variable 18 scoring exactly 2.50, thus indicating that all items/variables stated above were accepted by the respondents as policies that can be used to enhance performance of administrative process in Science Education. This was also confirmed by the cluster mean of 2.739 ± 0.283 , higher than the arbitrary mean of 2.50.

Hypotheses One:

Ho₁ – There is no significant relationship between Quality and the improvement of administrative processes in science education in Nigerian Higher Institutions.

Table 4: Relationship between Quality and the improvement of administrative processes in science education in Nigerian Higher Institutions
Correlations

		Improvement of administrative processes	Quality in Science Education
Improvement of administrative processes	Pearson Correlation	1	.398
	Sig. (2-tailed)		.507
	N	46	46
Quality in Science Education	Pearson Correlation	.398	1
	Sig. (2-tailed)	.507	
	N	46	46

P= ≤ 0.05 level of significance

The result presented in the table 4 displays a correlation r - value of 0.3981, thus implying that as the Quality in Science Education increases, so also does the Improvement of administrative processes as given by the positive nature of the r- value. The results also portrays that the relationship between Quality and the improvement of administrative processes in science education in Nigerian Higher Institutions is weak as indicated by the r- value, due to its distance from the positive whole number 1.

Hypotheses Two:

Ho₂ – There is no significant relationship between Accountability and the improvement of administrative processes in science education in Nigerian Higher Institutions.

Table 5: Relationship between Accountability and the improvement of administrative processes in science education in Nigerian Higher Institutions

Correlations

		Improvement of administrative processes	Accountability in Science Education
Improvement of administrative processes	Pearson Correlation	1	.879
	Sig. (2-tailed)		.121
	N	46	46
Accountability in Science Education	Pearson Correlation	.879	1
	Sig. (2-tailed)	.121	
	N	46	46

P= ≤ 0.05 level of significance

Presented in the table 5 is a correlation r - value of 0.879, which signifies that as Accountability in Science Education increases, so does the Improvement of administrative processes, given by the positive nature of the r- value. The results also show that the relationship between Accountability and the improvement of administrative processes in science education in Nigerian Higher Institutions is strong based upon the closeness of the r- value to the positive whole number 1.

Hypotheses Three:

Ho₁ – There is no significant relationship between enhanced performance of science education administrators and the improvement of administrative processes in science education in Nigerian Higher Institutions.

Table 6 reveals a correlation r - value of 0.284, indicating that an enhanced performance of science education administrators will stimulate an Improvement of administrative processes as given by the positive nature of the r- value. Consequently, the results presented a weak relationship between enhanced performance of science education administrators and the improvement of administrative processes in science education in Nigerian Higher Institutions due to the distance of the r – value 0.284 from the positive whole number 1.

Table 6: Relationship between enhanced performance of science education administrators and the improvement of administrative processes in science education in Nigerian Higher Institutions
Correlations

		Improvement of administrative processes	enhanced performance of science education administrators
Improvement of administrative processes	Pearson Correlation	1	.284
	Sig. (2-tailed)		.716
	N	46	46
enhanced performance of science education administrators	Pearson Correlation	.284	1
	Sig. (2-tailed)	.716	
	N	46	46

P= ≤ 0.05 level of significance

RESEARCH FINDINGS

The results presented above, revealed that, re-vamping the administration processes used in Nigerian higher institutions, re-structuring admission processes/exercises and examination processes, abolishing the one-size-fits-all dogmatic methods of administering exams, re-visiting and improving lecture methodologies, reducing the apparent gap between student and lecturers in terms of knowledge and intellectual transference are some areas of quality that can be improved upon in science education in Nigerian higher institution. Other areas that also need improvement include, reducing class size, increasing student accessibility to lecturers, improving infrastructural facilities, developing more conducive learning environments, and introducing audio/visual multimedia teaching/learning aids. This agrees with Omotoso, (2013), who stated that the major factors in the production of qualitative graduates revolve around admissions, examination, administration, course administration, certification and the recruitment and retention of experienced and hardworking workers.

Furthermore, enforcing laws that restricts lecturers from taking undue advantage of students, increasing the number of non-academic staff in a department/faculty for ease of administration processes, assigning each student to a non-academic staff to ease the burden of administration for ease of registration/retrieval of results, and assigning students to lecturers to increase student-lecturer contact in similar manner as when assigning students to their respective project supervisors for ease of exam supervision was revealed as ways in which Accountability in Science Education administrators can be improved. This is supported by Leveille, (2006).

The study also revealed that introducing staff training for the non-academic staff cadre, Introducing quarterly, bi-annually, or annual assessment of teaching styles/methods used by lecturers, Training lecturers on administrative skills, and Training lecturers to improve their lecturer/student social skills following the Universal Principle of “the-customer-is-king” as obtained in other business practices were areas that can be used to enhance performance of administrative process in Science Education. This in consonance with Usoro (2011: 20) who rightly observed that Nigerian higher institutions are ill-equipped to play the role expected of them.

CONCLUSION

This paper Improving Policy and Enhancing Performance for improved Quality and Accountability in Science Education highlights areas of quality of science education in Nigerian Higher Institutions, ways in which Accountability in Science Education administrators be improved, and ways to enhance performance of administrative process in Science Education. Spurred by the apparent decline in the quality of education and degeneration in the accountability and performance of science educational instructors in Nigerian Higher Institutions, the research results can be stated as follows;

- That as the Quality in Science Education increases, so also does the Improvement of administrative processes in science education in Nigerian Higher Institutions also increase.
- That as Accountability in Science Education increases, so will the Improvement of administrative processes in science education in Nigerian Higher Institutions increase.
- That an enhanced performance of science education administrators will stimulate an Improvement of administrative processes in science education in Nigerian Higher Institutions.

In view of this, there is the need for a genuine demand that public sector institutions such as educational institutions at higher levels should strengthen ethics, integrity, transparency, accountability and professionalism, in order to protect public resources, achieve quality and enhance public sector performance. Most importantly, the institutions should be made and held accountable (Omotoso, 2013), further stating that “If accountability has been below par in Nigerian higher institutions, productivity (Quality) has been equally damning”.

RECOMMENDATIONS

Based upon the above, it is recommended that;

- Nigerian Higher Institutions should concentrate on re-structuring admission processes, examination procedures and methods of course/lecture dissemination.
- Nigerian Institutions should focus on sensitive social outcomes based on good governance founded upon transparency and accountability
- Annual educational budgets should be improved upon and implemented by the Government and Higher institutions in Nigeria.

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