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Correlates of academic integrity in enhancing the quality and standard of science education in tertiary institutions in Delta state

Avwiri, H. E.
Institute of Education, Delta State University, Abraka, Nigeria
Email: havwiri@ gmail.com.

Abstract

This article explores the correlates of academic integrity in enhancing the quality and standard of science education in Tertiary Institutions in Delta State. The descriptive research design with two research questions and one hypothesis were used. The population for the study comprise of lecturers of science and education from three (3) tertiary institutions in Delta State, Nigeria. A sample of six (6) lecturers in the Faculty of Science and eight (8) lecturers in the Faculty of Education from each tertiary institution were consulted bringing the total number to forty two (42) lecturers sampled randomly for the study. The questionnaire was designed by the researcher the with the sole objective of extracting quantitative data utilized for the study, adopting frequency, percentages, and means as statistical tools, centred upon a four-point scale were employed to analyze the research questions, and Pearson's correlation was used to measures the statistical relationship between the means of the three groups with regards to the research hypothesis, with a reliability coefficient of 0.87 at a 0.05 level of significance. The study submits that Academic Integrity has a positive correlation and accounts for up to 54% of the Quality of Science Education in Tertiary Institutions in Delta State. Academic Integrity also has a positive correlation and accounts for up to 0.47% of the Standard of Science Education in Tertiary Institutions in Delta State. Conclusively, the concept of quality, in the delivery of science education has a positive correlation and accounts for up to 22% of the standard of science education in Tertiary Institutions in Delta State.

Keywords: 1. Academic Integrity 2. Quality 3. Standard 4. Science Education

Introduction

Academic integrity is a well establish topic in the academic community with an ever increasingexpanding frontier designed to cater for a broad spectrum of issues that underpinsthe concept of quality and standard of education. Akin & Johnson (2018) outlined that developing a global definition for academic integrity may not be possible, Macfarlane, Zhang, &Pun (2014) denoted that it is a problematic phrase as it is open to different interpretations, however Soroya, Hashmi&Soroya (2016) explained that in simple terms it could be described as honestand responsible scholarship. Academic integrity by definition results into a derivative meaning within the specified context of academia.

Theetymological study of the origin of the word, places it to have originated from the Latin adjective integer, meaning wholeness or completeness, used to describe the qualities of honor, uprightness, and consistency of character. The French translation for the word "intégrité" deciphers it to infer tothe squareness or trueness of anaffair. According to Macfarlane, et. al (2014)the Chinese word for integrity, is made up of two characters 'cheng' and'xin',a plagiarist of the word 'chengxin' used in the traditional Chinese language to denote honesty, uprightness and scrupulousness (Wu 2010).

Within the boundaries of academia, integrity refers to moral uprightness relating to the execution of teaching, learning and research, while the antonym would mean academic dishonesty, defined as anintentionally unethical behavior (Muafia,Ahmad, &Shahzadi, 2011) within the academic discipline, which translates toany form of unethical practice and misappropriation that occurs inrelation to a formal academic exercise spanning from cutting-corners, bribery, misappropriation of funds, misuse of office, to plagiarism.

The intent of the academic integrity as a policy measure is not merely to be the "police" of academic violations,but rather to create a culture and climate within institutions of learning and research that emphasizes, and is more conducive to, academic honesty (Cavico, & Mujtaba, 2009)and/or integrity.According Macfarlane, et. al. (2014)academic integrity as carried out by academics is drawn from different cognate fields of learning and researchincluding management, ethics, psychology, science and education, andas a result, there is awide range of literature connected with the ethics of teaching, learning and research.

McHaney, Cronan, & Douglas (2016) explained that while the quest for the quality for education remains the same, the environment within which academic integrity are being sought afterare quite dynamic in nature,as environments for learning are dramatically and dynamically different from region to region and from country to country, especially in today's digitally enhanced version of tertiary education where several educational materials are accessed online (McHaney, 2011), employing the use of technology in the execution of teaching, learning and research, consequentially altering the frequency of occurrence of academic integrity issues as reported by the

Office of research integrity, U.S Department of Health and Human Service as shown in Table 1 below.

Table 1: Frequency of case summaries report of scientific research misconducts (Closed cases)

Yearly	2015	2016	2017	2018	2019	2020
frequency	1	4	5	11	5	7
case status	Closed	Closed	Closed	Closed	Closed	Closed

(Extracted from the United States' Department of Health and Human Service, Research Integrity Division)

Stillquality education remains a high priority for academic cognitive domainsconsequently remainingthe leading indicator of academic achievementbased on the premise that it is easilymeasurable using standardized tests as denoted by UNICEF in its 2000 report, that quality education as a measurable educational outcome that encompass knowledge, skill and attitudes linked in tandem for the purpose of achieving development of national goals, edification and positive participation of society.

A single set of the standard for quality in education needs to be viewed in accordance to the Common Wealth Organization (2017) based upon the context of world-wide cultures and beliefsystems that influence the curriculums and approachesin methods of instructionand scholarshipsystems.The essentiality therefore of quality education cannot be over emphasized as it is being determined in a broad sense by the content, process and the academic outcome or academic prowess achieved.

Statement of the problem

The growing concerns that exist within the domain of education and science education specificallywith regards to the frequent incidences of academic dishonesty and the lack of integrity within the general academic community is abhorring. Mebratu (2016) exclaimed thatacademic dishonesty hasbeen drawing attention of scholars across the globe, irrespectiveof the emphasis on quality and standard in the educational sectoras maintained by the National Policy on Education (FGN 2004).Macfarlane, Zhang, & Pun (2014) lamented that this is attributable to the rapid massification of universityeducation and the cumulatingfigures of reported caseswith regards toworldwide academic fraud. Akin&Johnson (2018) described such academic misbehavior is as a scam, or con, and conducts of such manner tends to hamperthe quality of education,whichis often used as anindicator of the quality and standard of an academic institution.It is therefore paramount and consequentialto the academic community as this study explores the correlates of Academic integrity in enhancing the quality of science education in Tertiary Institutions Delta State, Nigeria.

Purpose of the study

This study explores the correlates of academic integrity in enhancing the quality and standard of science education in tertiary institutions in Delta State.

Theoretical background

Quality in Education

The notion of quality in the educational setting is unique and as well dynamic as it relates to several factors that are accountable for its actuality. Even though the simple and yet derivative meaning of quality is based upon the premise that a product has undergone specific test and required criterion to ascertain its compliance and suitability for consumption, in the educational setting the concept goes way beyond that simple definition.Even though no particular definition exists as far as the concept for quality in Education goes, there appears to be no universal unanimityon the appropriate strategy to adopt in order to ensureand utterly attainquality in higher education (Becket, 2006 as cited inBrucaj, 2014, in Thangeda, Baratiseng&Mompati, 2016). According to the Common Wealth Organization (2017) Quality in education across the education system consists of the applicationof the seven great principles of Effectiveness, Empowering, Equity, Sustainable, Appropriateness,Wellbeing and Safety (EEESAW).Quality education according to Hammond (2013)in Thangeda, Baratiseng&Mompati(2016) consists of the resources available, the technology involved, the program detail, the methodologies adopted in teaching and learning, academic qualifications of instructors, curriculum,performance awards, students and lecturers perspective and their general appraisal toward sortof education in question.

According to UNICEF in a report in 2000 defined quality in education ashealthy neophyteswho are ready to acquire knowledge through a systemized learning process,supported by their kinfolksand communities taking place in healthy, safe environments that are protective and gender-sensitive, thatoffersadequate resources amenities for teaching and learning purposes with a content matter that is reflected in relevant curricula designed for the acquisitionof required skills that are necessary in the educational domain of literacy, numeracy and general skills of life,which includes comprehensionin the general areas of health, nutrition, gender, prevention of HIV/AIDSin a conducive and peaceful atmosphere. According to their subsequent report in 2002, UNICEF maintains that processes that support quality education includes suitably trained teachers, lecturers and instructors engaged in the continual process of the development of the student or pupil, skillful in assessment employing appropriate methodologies maintaining a decent level of academic integrity.

Science Education

The discipline of science educationis saddled with a duality of conveying the knowledge and expertise of scientific premise in an educational cognitive domain, by sharing scientific contents and processes with individuals not traditionally regarded as being part of the scientific community.It therefore seeks todemystify scope of science, conveyingitsdepth of knowledge to learners who are regarded as not science inclined but are both motivated and eager to learn the discipline, and equipped to fully engage in scientific discussions to facilitate further and deeper study (Hazelkorn, Ryan, Beernaert, Constantinou, Deca, Grangeat, Karikorpi, Lazoudis, Casulleras, &Welzel-Breuer, 2015).

The history of science education emanated from the history of science itself and the history of education, which according toRudolph (2008) in addition to the broader field of history with all its various sub-fields are attributed to article of historical scholarship on science education over past decades denoted by the works of Mcleod & Mosely who outlined key issues related to university science instruction in 1978, drawing broadly on work from a number of historical fields to contextualize science education in the colleges and universities. This was later followed by the works of Jenkins' in 1980 with a detail summary on teaching of science in secondary schools in the twentieth century. In 1987, McCulloch's historiographical essay described histories related to school science and technology in England in the context of science education during the nineteenth and twentieth centuries. These articles collectively points out the foundational works in the field of science, the history of education, and relevance to teaching and learning science as an educational discipline (Rudolph, 2008).

Science education therefore focuses on learning in within the frameworksof science and mathematics in an educative manner. According to the Organization for Economic Cooperation and Development (OECD) there exists a distinction between knowledge of science and knowledge about science. Knowledge of science includes understanding fundamental scientific concepts and theories, while the knowledge about science entails understanding the essentialand core nature of science as a human activity and the power and limitations of scientific knowledge(OECD, 2009).Science education according to Hazelkorn et. al. (2015) was developed for this purpose by formal and informal science and education organizations working on new educational pedagogy in teaching and learning of science with guidelines for quality education.

Methodology

This study adopts a descriptive research design with two research questions and onehypothesiswereused. The population for the study comprise of lecturers of science and education from three (3) tertiary institutions in Delta State, Nigeria. A sample of six (6) lecturers in the Faculty of Science and eight (8)lecturers in the Faculty of Education from each tertiary institution were consulted bringing the total number to forty two (42) lecturers sampled randomly for the study. The questionnaire was designed by the

researcher the with the aim of extractingquantitative data used for the study, adopting frequency, percentages, and means as statistical tools, based on a four-point scale were utilizedto analyze the research questions, and Pearson's correlation was used to measures the statistical relationship between the means of the three groups with regards to the research hypothesis, with a reliability coefficient of 0.87 at a 0.05 level of significance.

Research Questions:

1. What role doesacademic integrity play in enhancing the quality of Science Education in Tertiary Institutions in Delta State?

2. To what extent does academic integrity influence the standard of Science Education in Tertiary Institutions in Delta State?

Research Hypotheses:

1. There is no significant relationship between academic integrity and the Quality and Standard of Science Education in Tertiary Institutions in Delta State.

Table 2: Responses to research question one

S/no	Variables	N	Strongly Agree (SA)	Agree (A)	Disagree (D)	Strongly Disagree (SD)	Mean	Remark
1.	I give credit to any other persons whose work I use in publishing	42	19 (45.24 %)	14 (33.33 %)	9 (21.43 %)	0 (0.00%)	3.238	Agree
2.	I always encourage my students to do their assignments independently	42	16 (38.10 %)	21 (50.00 %)	5 (11.90 %)	0 (0.00%)	3.262	Agree
3.	I encourage my students to properly give credit to other research materials they use in their seminars	42	17 (40.48 %)	9 (21.43 %)	14 (33.33 %)	2 (4.76%)	2.976	Agree
4.	I condemn cheating in any form be it academic or otherwise	42	21 (50.00 %)	8 (19.05 %)	13 (30.95 %)	0 (0.00%)	3.190	Agree
5.	I scold my students who copy each other's assignments	42	15 (35.71 %)	9 (21.43 %)	17 (40.48 %)	1 (2.38%)	2.905	Agree
6.	I do not encourage my	42	13	18	9	2	3.000	Agree

	students to cram to pass exams but to read and understand for the purpose of gaining knowledge		(30.95 %)	(42.86 %)	(21.43 %)	(4.76%)	
7.	My school's exam policy does not permit students utilize their smart phone or any other gadget during examinations	42	18 (42.86 %)	10 (23.81 %)	11 (26.19 %)	3 (7.14%)	3.024	Agree
8.	I give positive reinforcement to my students thereby instilling in them the moral virtues that hard work pays even in academics	42	10 (23.81 %)	12 (28.57 %)	15 (35.71 %)	5 (11.90 %)	2.643	Agree
9.	I always encourage academic resourcefulness in class during oral and written tests	42	13 (30.95 %)	18 (42.86 %)	7 (16.67 %)	4 (9.52%)	2.952	Agree
	Group Mean						**3.021**	**Agree**

InTable 2 above are the variables raised to capture quantitative data for the study with regards to the research question one. It showedthat all of the eight (8) variables raised (item 1 – 8) returned a mean score higher than 2.50, regarded as the adjudged mean benchmark, therefore implying that the respondentsposition was positive (ie. 2.50 and above = positive (agree)) to the above statements raised. Their position was further confirmed by the group mean of 3.021,also higher than the adjudged mean benchmark of 2.50, supporting the respondents claim that the above statements were a fact and therefore it can be inferred as role academic integrity play in enhancing the quality of Science Education in Tertiary institutions in Delta States.

Table 3: Responses to research question two

S/no	Variable	No.	Very Large Extent (VLE)	Large Extent (LE)	Low Extent (LE)	No Extent (NE)	Mean	Remark
1.	I teach my students how to properly make reference to their own text books while undergoing class work	42	12 (28.57 %)	14 (33.33 %)	10 (23.81 %)	6 (14.29 %)	2.762	Large Extent
2.	I scrutinize my students laboratory / practical workbook to ensure they carried out the test themselves	42	17 (40.48 %)	13 (30.95 %)	9 (21.43 %)	3 (7.14%)	3.048	Large Extent
3.	I expose to my students the technicalities in detailing test results of similar methodologies	42	13 (30.95 %)	15 (35.71 %)	9 (21.43 %)	5 (11.90 %)	2.857	Large Extent
4.	I allow my students to conduct research and experiments themselves in order to expose them to gain experience that comes with enough lab hours based on their individual academic need	42	16 (38.10 %)	13 (30.95 %)	7 (16.67 %)	6 (14.29 %)	2.929	Large Extent
5.	I provide my students with minimal supervision during laboratory practicals	42	8 (19.05 %)	19 (45.24 %)	12 (28.57 %)	3 (7.14%)	2.762	Large Extent
6.	I make my students adhere to every laboratory rule and guideline	42	23 (54.76 %)	15 (35.71 %)	4 (9.52%)	0 (0.00%)	3.452	Large Extent
	Group Mean						**2.968**	**Large Extent**

In Table 3 above, are displayed the variables raised to capture quantitative data with regards to research question two, and analyzed based on a researcher propounded mean ranging from 0.00 – 1.50 = NoExtent (NE), 1.51 – 2.50 = LowExtent (LE), 2.51 – 3.50 =LargeExtent (LE), and 3.51 – 4.00 =VeryLargeExtent (VLE). The table also revealsthat all six (6) of the items (item 1 – 6) returned a mean value above the adjudged mean benchmark of 2.50, implying that the respondentsposition with regards to the research question falls within the category of the mean range from 2.51 – 3.50, indicating that to a Large Extent the issues raised influence the standard of science education in Tertiary institutions in Delta State with regards to academic integrity. The table also revealed a group mean of 2.968, which also falls within the category of the mean range from 2.51 – 3.50,indicating that to a Large Extent the issues raised was further supported by the group mean reinforcing their claim that the issues raised influence the standard of science education in Tertiary institutions in Delta State with regards to academic integrity to a Large Extent.

Research Hypotheses One:

1. Ho_1: There is no significantrelationship between academic integrity and the Quality and Standard of science education in Tertiary institutions in Delta State

   Ha_1: There is a significant relationship between academic integrity and the Quality and Standard of science education in Tertiary institutions in Delta State

Table4: Pearson's correlation measuring the statistical relationship between the variablesacademic integrity and the Quality and Standard of science education in Tertiary institutions in Delta State**.**

Variables	*Academic Integrity*	*Quality of Science Education*	*Standard Of Science Education*
Academic Integrity	1		
Quality of Science Education	0.540567	1	
Standard Of Science Education	0.004796	0.225384	1

In Table4 are the summary for Pearson's correlation measuring the statistical relationship between the variables academic integrity and the Quality and Standard of science education in Tertiary institutions in Delta State, showing that Academic Integrity has a positive correlation of 0.540567 with the Quality of Science Educationin Tertiary Institutions in Delta State, and therefore by implication Academic Integrity accounts for up to **54%** of the Quality of Science Educationin higherInstitutions in Delta State. Table 4 also revealed that Academic Integrity has a positive correlation of

0.004796 with the Standard of Science Educationin Tertiary Institutions in Delta State, implying that Academic Integrity accounts for up to **0.47%** of the Standard of Science Educationin Tertiary Institutions in Delta State. Conclusively, the table also showed that theQuality of Science Education has a positive correlation of 0.225384 with the Standard of Science Educationin higherInstitutions in Delta State, also implying thatthe Quality of Science Education accounts for up to **22%** of the Standard of Science Educationin Tertiary Institutions in Delta State. Based on the forgoing, therefore there is a significant correlationbetween academic integrity and the Quality and Standard of science education in Tertiary institutions in Delta State.

Discussion of Findings

This study therefore endorses based on its findings that Lecturers in Tertiary Institutions in Delta Stategenerallygive credit to any other persons whose work they use in publishing, encourage their students to do assignments independently, encourage students to properly give credit to other research materials they use in their seminars, condemn cheating in any form, scold students who copy each other's assignments, do not encourage students to cram to pass exams but to read and understand for the purpose of gaining knowledge. Also the Lecturers' school exam policy does not permit students utilize their smart phone or any other gadget during examinations, as Cavico& Mujtaba (2009) reported that many schools have wireless access to the Internet and students are fully able to use this system to download the answers and cheat very easily. Furthermore, Lecturers generally give positive reinforcement to students instilling in them the moral virtues that hard work pays even in academics, and that theyalways encourage academic resourcefulness in class during oral and written testswereregarded as the general roles by lecturers in Tertiary institutions in Delta State that academic integrity plays in enhancing the quality of Science Education.In a similar study conducted in Ethiopia,Mebratu (2016) maintains that Academic dishonesty, compromises the quality of education, and is becoming the concern of most of the academic institutions in Ethiopia.

The study further to divulge that Lecturers in Tertiary Institutions in Delta Stategenerallyteach their students how to properly make reference to their own text books while undergoing class work, scrutinize students laboratory / practical workbook to ensure they carried out the test themselves, expose my students the technicalities in detailing test results of similar methodologies, allow students to conduct research and experiments themselves with the intention of exposing them to gain the experience that comes with enough lab hours with reference to their individual academic need, provide students with minimal supervision during laboratory practicals, and that making students adhere to every laboratory rule and guideline were regarded to a large extent as the general measures by which academic integrity influence the standard of science education in Tertiary institutions in Delta State. In fostering the quality of education, Adesugba, & Temitope, (2019) maintains that room should be given for flexibility,

adaptability, functional to circumstances, and encouragement of innovation and experimentation of different structures.

The study finallysubmits thatAcademic Integrity has a positive correlation and accounts for up to **54%** of the Quality of Science Educationin Tertiary Institutions in Delta State. Academic Integrity also has a positive correlation and accounts for up to **0.47%** of the Standard of Science Educationin Tertiary Institutions in Delta State, as quality implies the maintenance and improvement of a 'standard'which is in accordance with theassumption that standards are objective and quality is a continuous change (Common Wealth Organization, 2017). In agreement,Thangeda, Baratiseng&Mompati(2016) points out that the teaching system aneducationalinstitution employs has an effect on the quality and the kind of system that encourages research, citationand a plagiarism policy would prove more useful 'in standard'than one that does not in providing quality education. Conclusively, the Quality of Science Education has a positive correlation and accounts for up to **22%** of the Standard of Science Educationin Tertiary Institutions in Delta State.

Conclusion

Academic integrity therefore as a norm in the educational setting aims to increasethe quality that that educational institution offers which is centered upon its principles of quality,and quality as a by-product even in science education needs to bespecializedupon as anessential ingredient in order to attain the desired proficiency level. It must possess certain predefined criterion, which can always be further improved upon in order for it to be beneficial to the general populace to be consumed as an educational product.

Recommendation

Consequent upon the findings of this study, the researcher recommends that;

1. A distinction should be outlined between what is regarded as quality in education and what is regarded as standard in education
2. A balance should be maintained between what is regarded as quality in science education and what is regarded as standard in science education
3. Lecturers and teachers in science education should be consulted on collaborative levelsin order to ascertain proper quality and standard measures in education
4. Academic integrity should be introduced at the primary and secondary school levels
5. Nigerian educational sector should partner with universities and colleges in engineering more specific ways of upholding academic integrity and thereby improving the quality and standard of education

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