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Relationship between Performance of Quantity Surveying Students in Building Construction and Construction Measurement Courses

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ABSTRACT

Stakeholders in the educational sector over the century have devoted substantial resources in seeking ways of improving students' academic performance, yet, the desired improved academic performance has not been achieved. By appraising the relationship between the performance of Quantity Surveying (QS) students in Building Construction and Construction Measurement courses; the study identified a major curriculum drafting deficiency in the QS programmes in Nigeria which if addressed could help achieve the much needed improved students' academic performance. The specific objectives of the study were to determine the performance of QS students in Building construction and construction Measurement Courses; and to determine whether a relationship exist in the performances of QS students in the two subject areas. Purposive sampling technique was used to select Federal Polytechnic Ede, Osun State for the study. Random sampling technique was used to select 241 students who provide data for the study. Close ended questionnaire was used to collect data for the study and data was analyzed using frequency, percentile and correlation analysis. Finding indicates that 43% of the respondents on the average put up good performances in Building Construction Courses while only 19% of the respondents on the average had good grades in Construction Measurement Courses. Results also showed that a significant relationship exist between the performance of QS students in Building Construction and Construction Measurement courses as 83.3% (five out of six) pair courses shows significant positive linear correlation. The study recommends that a quick curriculum re-adjustment should be initiated so as to enhance improved academic performance by QS Students especially in Construction Measurement courses.

1. Introduction

The academic performance of students is an important determinant of success in any educational institution. Improving students' academic performance has being a major concern to every stakeholder in the education sector; this include the students, parents, lecturers, school management as well as government at every level. This is not only because there is observable downward trend in the academic performance of students but also because there is need to take students' academic performance to the next level. Igberadja (2016) opined that academic performance is used in the school to refer to students' success in learning specified curriculum content as revealed by continuous assessment and examination. Academic performance is designated by test and examination scores or marks assigned by the subject teachers (Adediwura and Tayo, 2007). Several factors have been identified to affect students' academic performance. These include gender, age, teaching faculty, teachers' qualification , teachers'

experiences, students schooling, father/guardian social economic status, residential area of students, medium of instructions in schools, tuition trend, class factors, daily study hour and accommodation as hostelries or day scholar (Ali et al., 2013).

The influence of age and gender on academic performance has been investigated in a number of studies with widely differing conclusions. Most of the differences in reported findings are due to varying contexts such as subject of study, age and gender interactions. Researches have shown that men perform better than women in certain settings while women outperform men in other settings (Haist et al., 2000). Borde (1998), on the other hand, found no evidence of academic performance being influenced by gender. Based on an analysis of close to two million graduating students, Woodfield and Earl-Novell (2006) found that female students outperformed male students and attributed this partly to female students being more conscientious and thus less likely to miss lectures. Graetz (1995) posited that a student educational performance depend heavily on social status of student's parents/guardians in the society. Students' academic performance is dependent on parent's income or social status (Considine and Zappala, 2002).

Socio-economic status of students and their families show moderate to strong relationship with academic performance (Sirin, 2005) but these relationships are contingent upon a number of factors such that it is nearly impossible to predict academic performance using socioeconomic status. Dumais and Ward (2010) found that there is no clear impact of family cultural capital on the grade point average of college students. Durden and Ellis quoted Bratti and Staffolani (2002) observed that the measurement of students previous educational outcomes are the most important indicators of students future achievement, this refers that as higher the previous appearance, the better the student's academic performance in future endeavours. Durden and Ellis (1995) earlier found that attendance did not matter for academic achievement in a Principles of Economics course unless a student had absent for minimum of four classes during the semester. The results of the study further show no gender-related differences in student performance. Henbry (1997) examined class schedule as a variable in student performance in a financial management course and found that students had a better chance of passing the course when a class was scheduled to meet more than once a week.

Ngoboka and Schultz (2002) investigated the effects of class size on student academic performance in a principle of microeconomics course and found from the regression results do not show any negative and significant effect of class size on students academic performance. This implies that, there was no evidence to support their hypothesis that academic performance is higher for students enrolled in the normal section rather than the large section. Fabunmi, Brai-Abu and Adeniji (2007) found that three class factors of class size, student classroom space and class utilization rate when taking together and individually determined significantly secondary school students academic performance. Igberadja (2016) studied the effects of teachers' gender and qualification on students' performance in vocational technical education. The study found that teachers' gender and qualification do not have any significant effects on students' performance.

Adeyemi (2010) and Yala and Wanjohi (2011) however found that teachers' experience and educational qualifications were the prime predictors of students' academic performance. On the contrary, Owolabi and Adebayo (2012) research examined the effect of teachers' qualification on the performance of Senior Secondary School students in Physics. The study concluded that students taught by teachers with higher qualifications performed better than those taught by teachers with lower qualifications. The results further showed that teachers' gender have no effect on their ability to impact knowledge on the students, much as he/she is a skilled teacher in that field of study. Ado (2015) examined the influence of learning environment on students' academic achievement in Mathematics; the study found that there is significance difference between the mean performance of students taught in an ideal learning environment and that of students taught in a dull learning environment. Learning environment is an essential key determinant to the students' academic performance. Basque and Dare (1998) posited that high performing students are likely to have been exposed to curriculum content under an ideal learning environment. In fact, Frenzel, Pekrun and Goetz (2007) attributed low academic performance to poor learning condition. This also affirmed the assertion of most scholars that students' educational performance is likely to be determined by the idealness of the learning environment (Ado, 2015).

Other factors that researchers have identified as having influence on academic performance include students' motivational levels (Fraser and Killen, 2005; Fraser and Nieman, 1995); students' self-awareness and students' ability (Meltzer et al., 2001); lecturers' teaching competence (Fraser and Killen, 2005); level of difficulty of study material (Sansgiry et al., 2006); students' self-efficacy (McKenzie and Schweitzer, 2001); students' effort (Fraser and Killen, 2005); lecture attendance (Thatcher et al.,

2007); socio-psychological factors (Malefo, 2000) and persistence needed to learn (Fraser and Nieman, 1995; Meltzer et al., 2001). Most of the studies on students' academic performances focus on the three elements that intervene, that is, parents (family causal factors), teachers (academic causal factors), and students (personal causal factors) (Diaz, 2003).

The combination of factors influencing academic performance, however, varies from one academic environment to another, from one set of students to the next, and indeed from one cultural setting to another. The most widely used measure of academic performance in an educational setting is the Grade Point Average (GPA) (Kuncel, et al., 2005). The Cumulative Grade Point Average (CGPA) is the weighted average of all the grades received by a student during his/her academic career (Nakanishi and Nishida, 1995). In the past, GPA has been found to have a reliability value ranging from 0.60 to 0.78 as an academic performance measuring scale (Elliott and Strenta, 1988). Several researches have addressed different aspects of students' academic performances, but no known study have examined the interrelationship between QS students' academic performances in Building Construction and Construction Measurement courses.

The focus of this study therefore was to appraise the relationship between academic performances of QS students in Building Construction and Construction Measurement courses with a view to formulate a better approach to improving students' academic performance in the courses. The motivation for this study emanated from the researchers' active participation in the tutelage of QS students at both Diploma levels (Ordinary National Diploma (OND) and Higher National Diploma (HND) in Polytechnic and undergraduate level in the university in which the study found a major curriculum deficiency problem this study is out to address.

2. Building Construction and Construction Measurement Courses

A critical examination of the curriculum of National Board for Technical Education (NBTE) for polytechnics shows that at OND level, students in Department of QS are required to register for the following building construction and construction measurement courses (Table 1); Building Construction Work I (BLD 103), Wood Workshop Practice (BLD 105), Building Construction work II (BLD 104), Block-laying and Concreting Workshop Practice (BLD106), Introduction to Measurement (QUS 101), Measurement of Building Works (QUS102), Building Measurement and Specification (QUS201) and Principles of Engineering Measurement (QUS 202).

Also, at HND level, every student is expected to register for; Advanced Measurement of Construction Work I (QUS301), Advanced Measurement of Construction Work II (QUS302), Advanced Measurement of Construction Work III (QUS 401), Advanced Measurement of Construction Work IV (QUS402), Construction Technology I (BLD 303), Construction Technology II (BLD 304), Construction Technology III (BLD 403) and Construction Technology IV (BLD 404). Considering the requirement of NBTE, a preceding Building Construction Course serve as pre-requisite for a succeeding Building Construction course while a preceding Construction Measurement Course also provide pre-requisites for another succeeding Construction Measurement Course.

However, the National University Commission (NUC) approved curriculum for University of Benin undergraduate QS Students revealed that every student seeking Bachelor of Science degree in QS must undergo the following Building Construction courses; Building Construction and Materials I (QSV 103), Workshop Practice (Wood) I (QSV 113), Building Construction and

Table1: *Building construction and construction measurement courses with their prerequisites for OND and HND QS Students*

Course Code	Course Title	Prerequisite
BLD 103	Building Construction Work I	None
BLD 105	Wood Workshop Practice	None
BLD 104	Building Construction Work II,	BLD 103
BLD 106	Block-laying and Concreting Workshop Practice	None
QUS 101	Introduction to Measurement	Ordinary Level Mathematics
QUS 102	Measurement of Building Works	QUS 101
QUS 201	Building Measurement and Specification	QUS 102
QUS 202	Principles of Engineering Measurement	QUS 201
QUS 301	Advanced Measurement of Construction Work I	QUS 201
QUS 302	Advanced Measurement of Construction Work II	QUS 301
QUS 401	Advanced Measurement of Construction Work III	QUS 302
QUS 402	Advanced Measurement of Construction Work IV	QUS 401
BLD 303	Construction Technology I	BLD 204
BLD 304	Construction Technology II	BLD 303
BLD 403	Construction Technology III	BLD 304
BLD 404.	Construction Technology IV	BLD 403

Materials II (QSV 104), Building Construction and Materials III (QSV 203), Building Construction and Materials IV (QSV 204), Advanced Construction Technology I (QSV 303), Building Services I (QSV 315), Building Maintenance I (QSV 317), Advanced Construction Technology II (QSV 304), Building Services II (QSV 316), Building Maintenance II (QSV 318), Advanced Building Construction Technology I (QSV 519) and Advanced Building Construction Technology II (QSV 518).

On the other hand, the following Construction Measurement courses are expected to be registered by every Undergraduate student in Quantity Surveying; Introduction to Quantity Surveying (QSV 101), Construction Measurement I (QSV 102), Principles of Measurement and Description I (QSV 201), Principles of Measurement and Description II (QSV 202), Advanced Measurement and Description I (QSV 301), Advanced Measurement and Description II (QSV 302), Advanced Construction Measurement I (QSV 501) and Advanced Construction Measurement II (QSV 502). It is revealing to know that in the University of Benin both the Building Construction courses and Construction measurement courses are without prerequisites, which implied that students' knowledge of one course does not have any effect on his/her performance on the other.

This research opined that Building Construction courses should be a pre-requisite for Building Measurement courses since Building Construction courses provide the theoretical and practical background for Construction Measurement courses so as to enhance students' performance. In order to test the proposition of this study the following hypothesis were formulated;

H0: There is no significant relationship between the performance of QS students in Building Construction courses and Construction Measurement courses.

H1: There is significant relationship between the performance of QS students in Building Construction courses and Construction Measurement courses.

3. Methodology

The study population for this research was QS students from School of Environmental Technology (SET) of the Federal Polytechnic Ede, Osun State, Nigeria. Purposive sampling technique was used to select the institution based on the working relationship the researchers had with the institution thereby enhancing ease of data collection. Random sampling technique was employed to select 40 per cent of all registered students for each course in four academic sessions (2009/2010 to 2012/2013) in each class of National Diploma (ND1), Higher National Diploma (HND1) and HND2. Ordinary National Diploma year two (OND 2) students were not surveyed because there were no Construction Measurement courses with corresponding Building Construction courses.

The information relevant to the study was sought through a structured questionnaire and filled by clerical officers in the Department of QS of the selected institution according to the information on the selected students Bio data file and from the record of students' academic results for the selected students who registered for the courses in the two areas. Correlation analysis, frequencies and percentile were used for analysis. The sample size for the study as indicated in Table 2 is 241 respondents.

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4. Results and Discussion

4.1 Characteristics of Respondents

Majority of the respondents according to the information in Table 3 were male (60.2%) while the female gender is minority (38.8%). This is expected because construction related courses are male dominated discipline (Ojo and Adeyinka, 2011). The average age range of the respondents was 21years; this is in line with the normal standard

Table 2: Sample Size for each Category of Respondents

Academic Sessions	ND1	HND1	HND2	TOTAL
2009/2010	23	20	20	63
2010/2011	22	18	18	58
2011/2012	28	16	16	60
2012/2013	26	17	17	60
TOTAL	99	71	71	**241**

educational age range in the Nigerian educational sector. Also, the respondents are in the accountability age range to understand their academic mission. The majority of the respondents parent/guidance were educated i.e. 74.3% of the respondents' fathers were educated at various level, while 68% of the respondents' mothers were educated. This implied that the majority of the respondents' parents have the requisite educational qualification to properly guide their wards.

Analysis of Table 4 showed that 60% of the respondents that registered for BLD103 performed well with grade score A, AB and B while 40% need improvement on their performances. For BLD104 and 404, 53% and 65% of the respondents had a good grade while the remaining 47% and 35% respectively need improvement on their performances. On the contrary, the performances of the respondents on BLD303, BLD304 and BLD403 need much improvement. While only 17%, 27% and 34% respectively of the respondents put up a good performance, 83%, 73% and 66% respectively need much improvement on their performances. This result showed that majority of the respondents needed much improvement on their performance in 50% of the Building Construction courses they registered for.

In the same vein, the performance of the respondents in Construction Measurement courses needed more proactive approach to address the abysmal poor performances. Out of 6 courses the respondents offered in this area, in none of the courses could up to 50% of the respondents score a good grade (A, AB and B). As indicated in Table 5, only 35%, 16%, 15%, 20%, 19% and 18% of the respondents that registered for QUS 101, QUS 102, QUS 301, QUS 302, QUS401 and QUS 403 respectively put up good performances. Therefore, on the average, about 81% of students that offered Construction Measurement courses needed improvement on their performance if the aspiration of stakeholders to have effective construction cost management will be achieved.

Table 3: *Characteristics of Respondents*

Category	Classification	Frequency	Per cent
Gender	Male	145	60.2
	Female	96	39.8
	Total	**241**	**100.0**
Age	16	11	4.6
	17	15	6.2
	18	24	10.0
	19	27	11.2
	20	29	12.0
	Above 20	135	56.0
	Mean	**21**	100
Father's Academic qualification	School leavers	47	19.5
	SSCE	28	11.6
	OND/NCE	35	14.5
	HND	43	17.8
	PGD	30	12.4
	Bachelor	41	17.0
	Masters	12	5.0
	Ph.D.	5	2.1
Mother's Academic qualification	School leavers	24	10.0
	SSCE	41	17.0
	OND/NCE	95	39.4
	HND	36	14.9
	PGD	17	7.1
	Bachelor	21	21.0
	Masters	5	2.1
	Ph.D.	2	0.8
	Total	**241**	**100**

4.2 Relationship between Quantity Surveying Students Performance in Building Construction and Construction Measurement Courses

A pair correlation analysis was run on the scores of QS student on QUS101 and BLD 103; where BLD103 was the independent variable and QUS 101 is the dependent variable. The result (Table 6) shows that: Pearson correlation = 0.726, Sig (2- tailed) = 0.000; Correlation is significant at 0.01 levels (2-tailed).

This results shows that a strong linear relation was observed between QUS 101 and BLD 103, Pearson correlation = 0.726, p = 0.000 (2-sided). This result implies that 72.6% of QS students' performance in QUS 101 can be accounted for by their understanding of BLD 103 while other factors not cover in this study account for the remaining 17.4%. The very high correlation between these two courses can be explained by the fact that majority of the new students were new to the two courses, therefore, the foundational understanding of this building construction course (BLD 103) will enhance their performances in construction measurement course (QUS 101).

Similarly, the result of pair correlation analysis run on the scores of QS student on QUS 102 and BLD 104; where BLD 104 was the independent variable and QUS 102 is the dependent variable shows that (Table 6): Pearson correlation = 0.214, P value = 0.033; Correlation is significant at 0.05 level (2-tailed). The result implies that there was a significant linear relationship between the performance of QS student in QUS 102 and BLD 104, Pearson correlation = 0.214, p = 0.033 (2-sided). The

Table 4: *Performances of Students in Building Construction Courses*

Grade	BLD 103		BLD 104		BLD 303		BLD 304		BLD 403		BLD 404	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
A	28	28.3	21	21.2	2	2.8	3	4.2	6	8.5	11	15.5
AB	11	11.1	16	16.2	4	5.6	5	7.0	13	18.3	13	18.3
B	20	20.2	16	16.2	6	8.5	11	15.5	12	16.9	19	26.8
BC	1	1.0	16	16.2	18	25.4	19	26.8	11	15.5	16	22.5
C	13	13.1	11	11.1	11	15.5	8	11.3	16	22.5	4	5.6
CD	14	14.1	8	8.1	14	19.7	12	16.9	7	9.9	3	4.2
D	4	4.0	9	9.1	8	11.3	6	8.5	5	7.0	3	4.2
E	6	6.1	1	1.0	7	9.9	5	7.0	1	1.4	1	1.4
F	2	2.0	1	1.0	1	1.4	2	2.8	0	0.0	1	1.4
TOTAL	99	100	99	100	71	100	71	100	71	100	71	100

Table 5: *Performances of Students in Construction Measurement Courses*

Grade	QUS101		QUS102		QUS301		QUS302		QUS401		QUS403	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
A	17	17.2	2	2.0	3	4.2	1	1.4	2	2.8	3	4.2
AB	10	10.1	8	8.1	1	1.4	2	2.8	4	5.6	2	2.8
B	8	8.1	6	6.1	7	9.9	11	15.5	7	9.9	8	11.3
BC	12	12.1	13	13.1	4	5.6	12	16.9	14	19.7	18	25.4
C	21	21.2	21	21.2	11	15.5	16	22.5	12	16.9	15	21.1
CD	11	11.1	14	14.1	12	16.9	12	16.9	12	16.9	7	9.9
D	8	8.1	16	16.2	18	25.4	10	14.1	8	11.3	7	9.9
E	12	12.1	15	15.2	13	18.3	5	7.0	9	12.7	8	11.3
F	0	0.0	4	4.0	2	2.8	2	2.8	3	4.2	3	4.2
TOTAL	99	100.0	99	100.0	71	100.0	71	100.0	71	100.0	71	100.0

reduced percentage in the performance of the QS students in QUS 102 (Measurement course) that could be account for by their scores in Building Construction course (BLD104) could be as a result of their residual knowledge in BLD 103.

On the contrary, the result of pair correlation analysis run on the scores of QS student on QUS 301 and BLD 303; where BLD 303 was the independent variable and QUS 301 is the dependent variable (Table 6) shows that: Pearson correlation = 0.189, Sig (2- tailed) = 0.113. This result implies that correlation is not significant. This result shows that only 18.9% of the performance of QS students on QUS 301 could be accounted for by their understanding of BLD 303. This result is expected because the students in this category were fresh returnees from a year industrial training and this will boost their knowledge of measurement irrespective of their performances in BLD 303. Furthermore, a pair correlation analysis was run on the scores of QS student on QUS 302 and BLD 304; where BLD 304 was the independent variable and QUS 302 the dependent variable. The result (Table 6) shows that: Pearson correlation = 0.478, Sig (2- tailed) = 0.000; Correlation is significant at 0.01 levels (2-tailed). This result indicated that a strong linear relation was observed between QUS 302 and BLD 304, Pearson correlation = 0.478, p = 0.000 (2-sided). This could be explained to mean that 47.8% of QS student scores on construction measurement (QUS 302) could be accounted for by their understanding of Building construction course (BLD 304).

In addition, a pair correlation analysis result on the scores of QS student on QUS 401 and BLD 403; where BLD 403 was the independent variable and QUS 401 is the dependent variable (Table 6) shows that : Pearson correlation = 0.356, Sig (2- tailed) = 0.002; Correlation is significant at 0.01 level (2- tailed). This result means that 35.6% of the scores of QS students on QUS 401 could be accounted for by their understanding of BLD 403. Finally, the result of pair correlation analysis run on the scores of

Table 6: Results of Correlation between Paired Courses

Paired Correlated courses	Pearson Correlation	Significant Value(2-tailed)	Point of Significant
QUS101 and BLD 103	0.726	0.000	0.01
QUS 102 and BLD 104	0.214	0.033	0.05
QUS 301 and BLD 303	0.189	0.113	-
QUS 302 and BLD 304	0.478	0.000	0.01
QUS 401 and BLD 403	0.356	0.002	0.01
QUS 402 and BLD 404	0.582	0.000	0.01
QUS and BLD	0.435	0.000	0.01

QS student on QUS 402 and BLD 404; where BLD 404 was the independent variable and QUS 402 is the dependent variable shows that (Table 6): Pearson correlation = 0.582, Sig (2- tailed) = 0.000; Correlation is significant at 0.01 level (2- tailed). This result indicated that a strong relationship exist between the performance of QS students in QUS 402 and BLD 402. Impliedly, 58.2% scores of the selected student scores in QUS 404 could be accounted for by their understanding of BLD 404.

4.3 Test of Hypothesis

A correlation analysis was run on the scores of QS student on Construction Measurement Courses (QUS) and Building Measurement Courses (BLD); where BLD were the independent variables and QUS were the dependent variables. The result (Table 6) shows that: Pearson correlation = 0.435, Sig (2- tailed) = 0.000; Correlation is significant at 0.01 levels (2- tailed).

Decision rule:

P<0.05 reject null hypothesis; accept alternate hypothesis

P>0.05 accept null hypothesis; reject alternate hypothesis

This result shows that P<0.05; therefore the alternate hypothesis was accepted which implied that a statistically significant relationship exist between the performance of QS students in Building construction courses and construction measurement courses. This result therefore implies that the existing practice of treating Building construction measurement courses as independent course is hampering the performance of QS students in these courses. It is therefore pertinent that policy makers understand this interrelationship dynamics between the courses in these core areas of study for QS students so as to achieve improved students academic performances. Comprehensive understanding of Building Construction courses is required for QS students to perform well in Building Construction Measurement Courses. Therefore compelling a mandatory good performance in a preceding Building Construction Course before a student is allow to register for succeeding Building Construction Measurement course will mean that the student must understand the details of Building Construction work before he/she can understand how to measure building construction works.

5. Conclusion and Recommendation

The study examined the interrelationship between the performances of QS students in Construction Measurement and Building Construction courses. On the average, only 43% of QS students had good scores in all the Building construction courses they registered for while 19% of them on the average put up a good performance in all Building Construction Measurement courses they offered. 83.3% of the six pair courses show strong and significant relationship between the two broad areas. Also the test of hypothesis indicated that a significant relationship exist between the entire courses registered for in this two area. From this revelation therefore, it can be concluded that the understanding of Building Construction courses by QS student will enhance their performances in Building measurement Courses. In order to address the abysmal poor performance of QS students especially in Construction Measurement Courses, it is recommended that a major curriculum readjustment is done such that a preceding Building Construction course will be a pre-requisite for the succeeding Building Measurement course rather than the current practice where the preceding Construction Measurement/Building Construction course is pre-requisite for the succeeding Construction Measurement/Building Construction course in some instance (Ordinary and Higher National Diploma level) and no pre-requisite at all in some universities degree programme in Quantity Surveying. To enhance improved future performance of QS student curriculum drafters should see each Building Construction as an independent course and the performance of a student in a Building Construction Course does not depend on his/her residual knowledge in the preceding Building Construction course. Rather, QS curriculum should be draft in such a way that residual knowledge of QS students in a previous Building

Construction Course will aid their performance in the current Building Construction measurement course since in the real world the understanding of construction details will be a pre- requisite for measurement of construction works.

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