



Pre-Qualification Academic Requirement as a Predictor of Academic Performance in a Building Technology Programme: A Case of Lagos State Polytechnic

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Abstract: Student academic performance has been a source of concern to academics, researchers and relevant stakeholders at tertiary educational level. This resulted in a situation where academic institutions develop pre-qualification criteria aimed at selecting the best candidates. This study is aimed at exploring the relationship between academic performance and pre-qualification criteria. A content analysis was carried out on the student academic records and O'levels entranced grades in the department of Building Technology in Lagos State Polytechnic (LASPOTECH). Both Higher National Diploma (HND) and National Diploma (ND) students between the year 2006-2010 academic results were considered for the analysis. The data collected was analysed using linear and multiple regression technique. The study shows that O'level score in Physic is significant to the academic performance of Building Technology students in the Polytechnic compared to the other O ' level subjects. The findings indicate that pre-qualification criteria could serve as a predictor of academic performance. These findings support that institutional pre-qualification criteria can provide vital information for admission committees and education policy makers.

Keywords: Academic performance, building technology, grade point average, pre-qualification criteria

1. Introduction

The construction industry is one of the important drivers of macro and micro economic growth in any nation. Empirical evidence has shown a positive relationship between construction industry output and Gross Domestic Product (Oladinrin et al., 2014). It is

generally known that projects in the construction industry involve numerous individuals with varying skills and expertise. Hence, the construction industry needs intellectual development aimed at optimising outcomes and project performance.

The need to improve construction industry's output has been linked with the need to manage multi-disciplinary professions. According to Acharya et al. (2006), diversity of skills, knowledge and expertise of professionals within the construction industry often leads to adversarial relationships which affect its outcomes. Similarly, several inquiries into the activities within the construction industry have shown its poor performance (Egan, 1998). Cieszynski et al. (2005) asserts that established disciplines within the construction industry majorly focus on design aspects, giving little or no training in management. Thus, this seems to suggest that the lack of managerial expertise might be responsible for poor performance recorded.

In the Common Wealth countries, building technology (or building) is a discipline within the construction industry. Council of Registered Builders of Nigeria (2012:1) reveals that the core competence of building graduates relates to "science, technology and management of the building production and maintenance and deconstruction" within the construction industry. It can be argued that the emergence of building as a discipline could be due to the need to meet managerial skill gap and the need to improve construction project performance. It can be seen that 'building' as a discipline plays a crucial role in construction process improvement.

Studies have shown the positive relationship between job performance and academic performance (Kuncel et al., 2004; Roth et al., 1996). Academic performance has been a subject of research in several fields. However, however, most studies of academic performance have only been carried out on other disciplines. For instance, business and management related disciplines (Ali Al-Twaijry, 2010; Byrne & Flood, 2008; Lebcir et al., 2008); Medicine (Ross et al., 2006); Nursing (Rochford et al., 2009); Pharmacy (Sansgiry et al., 2006); Construction management (Orth, 2004) and Technical and Vocational Education Program (Alias & Zain, 2006). Although a number of studies exist on academic performance, a significant portion of studies has focused on identifying factors affecting academic performance. However, very little has been written about the relationship between entrance qualification and academic performance. Therefore, this study is aimed at assessing the relationship between pre-qualification academic requirement and academic performance.

2. Review of Literature

A review of the literature provided a broad list of factors that have been used as predictors of academic performance which includes prior academic performance, admission qualifications, gender, mode of study (full time/part time), competence in language, student's

family background, culture, and age. A study conducted by McKenzie and Schweitzer (2001) on factors predicting academic performance focused on first year students in an Australian university. It was found that prior academic achievement and self-efficacy are positively related to academic performance. Byrne and Flood (2008) found that academic performance of first year, accounting students was dependent on prior academic achievement, prior knowledge, gender and motives, expectation and preparedness. However, a study on academic performance of foreign Master of Science students in the United Kingdom showed that the predictor of academic performance of such students includes: perceived significance of learning success to family, proficiency in English and social communication with compatriots (Li, Chen & Duanmu, 2010).

Furthermore, Elias et al. (2011) evaluates the impact of stress on academic performance in a University in Malaysia. It was found that students in the Faculties of Medical and Health Science, Engineering and Veterinary Medicine were more prone to stress; in addition, stress level increased with year of study. The study was concluded with results showing stress has a negative impact on academic performance of students. This is similar to the results of Yang's (2004) study on

students of vocational colleges in Taiwan. In related studies on the impact of the use of online social network (such as Facebook) on academic performance, a negative relationship was established (Kirschner & Karpinski, 2010; Paul et al., 2012). In Van Rooyen et al. (2006) study on the relationship between entry criteria and student academic performance in an undergraduate nursing programme in New Zealand, it was found that entry criteria and age were good predictors of academic performance. However, the effect of entry criteria seems to reduce with level of study. This is consistent with the findings of a study conducted by Hoefler and Gould (2010) which found that entry criteria are predictors of student academic performance. Alias and Zain (2006), investigates the relationship between entry qualification and performance in graduate education within students of Master in Technical and Vocational Education program (MTVE) in Malaysia. Alias and Zain surveyed the graduating students academic records, the results of the study indicates that the relationship between the Undergraduate Cumulative Point Average (UCPA) and Graduate Cumulative Point Average (GCPA) for MTVE program is weak but statistically significant. They confirmed that as UCPA increases, the GCPA also tends to increase. Alias and Zain (2006), study

indicate also indicate that UCPA is a significant predictor of GCPA for Civil Engineering, Electrical Engineering, Mechanical Engineering, and Business and Management programs.

It is evident that despite the use of the same research approach (i.e. quantitative) in these studies, there is a divergence in the findings. The variance in the results might be due to sample size, study population and sample characteristics. Hence, educational and academic policy maker's may find it difficult sometime to ascertain entrance qualification requirement to programs in an institution due to these inconsistencies. These inconsistencies necessitate an in-depth study aimed at assessing the relationship between student

academic performance and entrance qualification requirements for a building technology program.

2.1. A Brief Overview of Secondary School Certificate Examination Grading System

In Nigeria, two bodies conduct Secondary School Certificate Examination at Ordinary level, these bodies are: West African Examination Council and National Examination Council. These examinations are equivalent to those held by similar examination councils at Ordinary Level (O'Level) of Senior Secondary education. Both examinations are graded as depicted in Table 1. It is evident that A1 is the highest grade attainable; however, F9 is the least grade.

Table 1: SSCE Examination grades

Grade	Interpretation
A1	Excellent
B2	Very Good
B3	Good
C4	Credit
C5	Credit
C6	Credit
D7	Pass
E8	Pass
F9	Fail

2.2 Admission into the Building programme at Lagos State Polytechnic

Pre-qualification criteria for undergraduate programmes in building are institution dependent and related to its admission policy.

Hoefler and Gould (2000) points out that student admitted based on this criteria share similar characteristics. Tertiary institutions (i.e. Polytechnics and Universities) in Nigeria have distinct admission

requirements, some of which are explicit and others implicit.

Quantitative admission criteria usually consist of grades attained in Secondary School Certificate Examination (SSCE), Unified Tertiary Examination (UTME), Post UTME examination organised by each tertiary institution in Nigeria and an admission index (AI, a mathematical weight of UTME and Post-UTME). The main aim of the admission criteria used in selecting prospective students is to select best candidates who can achieve a certain level of academic performance. It is imperative to note that other qualitative admission criteria are also used during the selection process (e.g. diversity of student population, students from educationally disadvantaged regions etc.).

Currently, Lagos State Polytechnic (LASPOTECH) runs two-streams (i.e. Part and Full-Time) of programmes leading to the award of National Diploma and Higher National Diploma in Building. It is important to note that passing 5 O'level subjects (Mathematics, English, Physics, Chemistry, and any other science/social science subjects) at credit level is an admission requirement that must be fulfilled by prospective students for both full and part-time studies. However, for admission into full-time programme, there are additional requirements for UTME and Post-UTME. Hence, this study is aimed at ascertaining, if meeting

SSCE requirement predicts student's academic performance. Information provided from this study will be of interest to all admission staff and faculty of building programmes interested in ensuring that the prequalification criteria for admitting new students represent what they claim to measure.

3. Research Method

A descriptive and inferential statistics, research approach was adopted for the study. A content analysis was conducted on the student's academic records of the Department of Building Technology, Lagos State Polytechnic. Data used in this study is obtained from the final academic results (CGPA) of all building students who have graduated from the department in HND program within the academic period considered. A sample of sixty-one HND students that graduated from the building programme over a 7 year period (1998-2014) was selected. The graduated students were selected based on the facts that their final CGPA had been established, and this can be used to determine their academic performance throughout the span of the academic sessions.

Their performance during the years in the department is measured by the Cumulative Grade Point Average (CGPA) obtained by each student on completion of the programme. This is consistent with Sansgiriy et al. (2006) which also

used CGPA as a measure of student academic performance. However, grades obtained in SSCE were used as a measure of prequalification academic requirement.

The SSCE grades were further recalculated using: $(9-n)$ where 'n' is the grade obtained in SSCE. Thus, if a student obtains B3 in mathematics, the grade is recomputed and 6 is used for analysis. The data obtained from students' records were later transferred into coding sheets and entered into the statistical package for social sciences (SPSS) programme to be analysed. The statistical tools that used to analysis the data collected in this research are linear and multiple regression. The analysis conducted will examine the relationship that exists between the independent and dependent variables; i.e. how the prior academic achievement in SSCE affects performance of building technology students at the polytechnic.

4.0 Results and discussion

Linear regression

In carrying out the regression analysis, the predictor variables used in the regression model are

grades obtained in all required SSCE (i.e. Mathematics, English, Physics and Chemistry) subjects and CGPA obtained on completion of the programme. The strength of association of the dependent variable (in this case the scores in final CGPA for degree) and the predictors are measured by the coefficient of multiple determination, or R^2 .

Table 2 shows linear regression analysis test results. The linear regression performed for this study indicates that physics SSCE grade as a predictor variable explains 9.1 percent variance in students' CGPA obtained in the final semester. In addition, the correlation co-efficient was found to be 0.302 and its significant value of 0.018, and the model is significant at $p < 0.05$. However, other SSCE subjects (i.e. English, Chemistry and Mathematics) do not adequately predict the CGPA obtained on completion of the building programme at LASPOTECH. Thus, this shows that student with good score in SSCE physics tend to perform better during building undergraduate training than other students.

Table 2: Linear regression analysis of SSCE subject and CGPA

Models	R²	Standardized coefficients (R)	F	Sig.
With English language scores (SSCE)	0.002	0.044	0.114	0.736
With Mathematics scores (SSCE)	0.000	-0.011	0.007	0.934
With Physics scores (SSCE)	0.091	0.302	5.932	0.018
With Chemistry scores (SSCE)	0.000	-0.014	0.012	0.913

Multiple regression

A standard multiple regression test was conducted to determine the combined effect of grades obtained in SSCE subjects on CGPA. The results of the multiple regression test are shown in Table 3. The standard regression analysis shows that the result is not statistically significant at $p < 0.05$ expect for physics. The other courses (English language, Mathematics, Chemistry)

were excluded variables from the model. Meaning that they don't have a significant contribution to CGPA outcomes. In standard multiple regression physics model to predicts the CGPA at graduation has a significance value of 0.018. The level of significant of the variables shows the level of contribution of each variable to the prediction of CGPA.

Table 3: Standard multiple regression analysis of SSCE subjects and CGPA

Variables	Correlation coefficient	Standardized coefficient	F	Sig.
With English language scores (SSCE)	0.44			
With Mathematics scores (SSCE)	-0.11			
With Physics scores (SSCE)	0.302	0.302	5.932	0.018
With Chemistry scores (SSCE)	-0.014			

Discussion

This paper has examined the relationship between entry (i.e. admission) requirements and performance in a building technology program for graduate building students in LASPOTECH. In view of the four O'level subjects (i.e. Mathematics, English language, Physics and Chemistry) used for regression analysis, it was only Physic that had a significant relationship with CGPA obtained in building technology program. However, the strength of the relationship is weak, because only 9.1% variance in the CGPA is attributable to Physic. It is doubtful where those students who performed well in O'level examinations could have adequate capability to obtain a high CGPA. This is consistent with the results of

similar studies in van Rooyen et al. (2006) and Hoefler and Gould (2010). But, the result is in contrast to the findings of a similar study (Orth 2004) which found that academic achievement in high schools is a good predictor of academic performance in a construction management program. The study of Alias and Zain (2006), indicates a positive correlation existed between UCPA and GCPA, and as UCPA increases, GCPA also tends to increase.

It is imperative to note that this study is not targeted at making generalizations due to obvious limitation (sample characteristics). However, the results provide insights into the inadequacies of entry requirements at a tertiary institution; thus, highlighting the need for a revision so as to ensure

highly qualified students are admitted. Due to these limitations, there is a need for further studies which will further extend the findings of this study by considering a combination of grades obtained in O'level, UTME and Post-UTME. In addition, other factors that affects academic performance should be investigated considering a wider sample frame.

5.0 Conclusion

O'level SSCE results are a major aspect of the entry criteria used by LASPOTTECH in admitting students into the building programme (Full/Part-Time) so the relationship found to exist with students' academic performance is important. This information will be useful to admission committees as it can serve as benchmarks for declining student likely not perform well.

There are obvious limitations to a study of this type; a major limitation is access to data. As at the time of conducting this study, the authors only had access to the SSCE results and CGPA at graduation. The implication of which is the limited analysis which did not consider other variable such

as CGPA at different levels, age and so on.

Based on the result of the data analysis, it was found that there is a relationship between the combined SSCE (i.e. Maths, English, Physics and Chemistry) requirement and academic performance. However, when the subjects are considered individually, it was only the grades obtained in Physics that could predict academic performance. This is consistent with the results of similar studies in van Rooyen et al. (2006) and Hoefer and Gould (2010). It is pertinent to note that this relationship is weak; hence, grades obtained in SSCE alone cannot adequately predict student adequately predict student academic performance. This seems to suggest that the current practice of using multiple quantitative entry requirements (SSCE, UTME and Post-UTME) could be a better benchmark for selecting best candidates. Therefore, it is suggested that future studies should evaluate the relationship between UTME, Post-UTME and academic performance. In addition, this study could also be replicated in other tertiary institutions such as Universities.

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