
ENTRY QUALIFICATION AS CORRELATE TO ACADEMIC PERFORMANCE OF STUDENTS IN NIGERIAN CERTIFICATE IN EDUCATION
(TECHNICAL) AT POLYTECHNIC LEVEL IN BAUCHI

By

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ABSTRACT

This study determined the levels of academic performance of two groups of students admitted with different entry qualifications to the Nigeria certificate in Education (NCE) Technical Programme and found out whether groups differed significantly in terms of performance. Seventy (70) first year Technical students at Tatari Ali Polytechnic, Bauchi, were monitored during the 2015/2016 academic year for the purposes of this study. The data consisted of raw scores obtained by these students in five (5) courses. The data were analysed according to their arithmetic means and a t-test. The reliability of t-test results was ascertained by the use of an f-test of group variances. The study established that the secondary school certificate students performed significantly better than their National Technical Certificate and other certificate counterparts, and both groups differed significantly in other aspects of academic performance.

INTRODUCTION

Human civilization is quite often linked to technological advances and developments. Technical education is thus an instrument of technological advancement and industrialisation (Amasuomo & Biebuma, 1990). This has been corroborated by Haruna (2010), who reported that the key manpower needed for the rapid development of a nation is technical in nature. This is because it is the technical manpower that induces the acceleration of scientific and technological development; in order for a country to advance technologically, it therefore requires teachers trained in technical education. It was in realisation of this that the Nigerian government established the Federal Colleges of Education (Technical), while the state governments established vocational and technical education departments in the conventional Colleges of Education and polytechnics.

The technical teachers graduating from these colleges are expected to teach Introductory Technology in either Junior Secondary Schools or Vocational Training Centres/Junior Technical Colleges, and to specialise in a profession such as automotive, building construction/block laying, electrical/electronic, metalworking or woodworking technology education. This is in line with the aim of the Nigeria Certificate in Education (NCE) Technical Programme, which is to provide technical teachers with the intellectual and professional background adequate for teaching technical subjects and to make them adaptable to any changing situation in technological development, not only in the country, but also in the wider arena of the world at large (NCCE 2012). At present, two groups of students are admitted into the NCE (Technical) Programme. These are those students with either Senior Secondary School Certificates (SSCE) or National Technical Certificate or West African Examination Council (WAEC) and Technical

Intermediate Craft Certificates (NBTE 2012). The SSCE certificate is awarded to students from the secondary schools, while the NTC or WAEC Technical Certificate is awarded to students from technical colleges. The entry requirements for the School Certificate group is a passing mark in at least five (5) subjects, including a passing mark in English language and three (3) credits passed in mathematics and two (2) different science subjects. These requirements should be obtained at no more than two sittings in the West African School Certificate Examinations or its equivalent.

The National Technical Certificate or WAEC Technical group consists of students who have met the entry requirements by passing either the NTC or WAEC Technical Intermediate Craft Certificate, as well as five (5) credits in English Language, Mathematics and three (3) in other Science subjects on the Federal Craft Certificate (FCC). Both groups of students are admitted into the Nigeria Certificate in Education (Technical) after passing the entrance examination given by the Joint Admission Matriculation Board (JAMB) for the Colleges of Education and Polytechnics.

In light of the foregoing, the study is therefore an attempt to determine the levels of academic performance of the secondary school certificate and the National Technical certificate groups of students. Various factors contribute to determining the academic performance of students in any educational endeavour. These factors may range from the academic background of the students admitted to a programme of study (Ihiegbulem, 1992; Geiser & Stantellices, 2007), the type of school a student attended prior to admission into a programme (Kyoshaba, 2009; Considine & Zappala, 2002), and the various entry qualifications obtained by the students for admission into a higher academic programme (Ibe-bassey, 1988; Mlambo, 2011).

According to Wikipedia (2013), academic performance is the outcome of education; it is the extent to which a student, teacher or institution has achieved

their educational goals. Thus, performance is characterised by performance on tests associated with coursework and the performance of students on other types of examinations (NBTE, 2012).

Various studies have been carried out on the factors that affect students' academic performance or achievement in schools, colleges and universities. Some of the factors identified and reported to have affected the academic performance of students in these different settings are: student effort, previous or prior educational performance, self-motivation, the social-economic status of the students' parents, the students' age, number of hours of study per day, admission points, different entry qualifications, tuition trends and the students' area of residence (rural or urban) (Farooq, Chaudry, Shafiq & Berhanu, 2011; Ali, Haider, Munir, Khan & Ahmed, 2013).

Admission points and the different entry qualifications, which are the results of prior or previous academic performance likely to affect the students' future academic performance, have been considered in this study, as this research concerns the academic performance of students admitted with different entry certificates. Tertiary institutions all over the world, including Nigeria, use prior academic performance in terms of admission points or different entry qualifications/certificates as a basis for selecting students for admission into the colleges of education, polytechnic schools and universities. These admission points or entry certificates are always of equivalent rating or value, even though they may be awarded by different examination bodies. Thus, Bratti and Staffolani (2002) observed that the measurement of the students' prior educational outcomes or performance is the most important indicator or determinant of the students' future academic performance.

The type of school a child attended also affects the academic performance of the student. In this regard, Kyoshaba (2009) observed that students' educational outcome and academic success is greatly influenced by

the type of school which they attended. The school we attend is the institutional environment that sets the parameters of a student's learning experience. In agreement with this, Considine and Zappala (2002) reported that the type of school a child attends influences the educational outcomes; furthermore, schools have an independent effect on the students' educational attainment, and this is likely to operate through the variation of quality and attitudes. In the same vein, Miller and Birch (2007), while studying the influence of the high school attended on university performance, observed that outcomes at the university level differ according to the type of high school attended. Thus, a student's school background is positively related to his or her academic performance at an undergraduate level. In addition, Ali et al. (2013) and Kwesiga (2002) also observed that the learning outcomes and educational performance of students are strongly affected by the type of educational institution where they received their education. However, this is a function of the number of facilities a school offers, which usually determines their quality, and which in turn affects the performance and accomplishments of its students.

Entry qualifications linked to different certificates of equivalent value for student admission into post-secondary institutions is another factor that affects the students' academic performance at post-secondary levels. Although the certificates each group of students obtained from different examination bodies may be equivalent, the curriculum content and the expected educational outcomes may not be exactly the same. In a study conducted by Ringland and Pearson (2003) on the difference between diploma entrants and direct 'A'-Level entrants and the subsequent performance of each group reported that there was no significant difference between the groups; however, performance in terms of academic achievement prior to reaching the university did appear to affect performance at university to a small

extent. In a related study, Mlambo (2011) observed that for a number of institutions, student admission is based on a number of different qualifications, to the extent that students receiving instruction in the same course differ greatly in terms of their prior knowledge.

This being the case, one might wonder whether other researchers totally agree that prior educational performance, admission points and different entry qualifications truly affect future academic performance. The answer is no. In a study on the relationship between previous academic performance and subsequent achievement at the university level, Huws, Reddy and Talcott (2006) found that students learning or studying at the graduate level and scores earned failed to predict any level of academic achievement at university. The Academic Admission Council at Oregon State University (2003) also disagreed with the view that academic performance is determined by prior academic performance. They held that traditional measures of academic potential, such as grade point average or 'A'-level grades did not predict academic performance at university. Mlambo (2011) also reported that there was no significant difference in the academic performance among students due to differences in the admission criteria employed; the same study observed that while varied, these criteria adequately assessed the potential of students to handle the demands of courses in agriculture. However, holders of diplomas in agriculture and other qualifications appeared at the bottom of the academic performance chart.

Nonetheless, it is very important to note that even though these studies do not agree with former studies that indicate achievement in previous studies affects future performance, they did confirm that admission scores are related to academic performance at the university level, but to a very minimal extent (Ali, et al.; Mlambo, 2011; Kyoshaba, 2007).

In light of the related literature reviewed, it seemed pertinent to find out whether there is actually any

difference in the academic performance of students with different qualifications. This is because quality technical teachers are very relevant in technical education. Thus, the success or failure of any technical education system is dependent on the quality of its teachers (Banjo, 1974). Also, the level of academic performance of the students in the NCE Technical Programme could prove to be an index of the quality of the technical teachers in the system (Ihiegbullem, 1992). Thus, this level of academic performance, in terms of the two groups of students admitted into the NCE Technical Programme with SSCE or C & G certificates, respectively, was the subject of examination of this study. It also examined whether the groups differed significantly in terms of their academic performance.

Objectives of the Study

Specifically, the objectives of this study were to determine:

1. The levels of academic performance of two groups of students, one with a senior secondary school certificate and another with a NTC certificate or WAEC Technical, admitted to the NCE Technical Programme.
2. Whether the academic performance of the groups differed significantly.

Research Questions and Hypothesis

Based on the stated objectives, the study sought answers to the following research questions:

1. What are the levels of academic performance of the senior secondary school certificate and NTC certificate students in each of the selected courses in the study?
2. Does the academic performance of the groups differ significantly in the selected courses?

The following null hypotheses were formulated as a guide the study:

1. There is no statistically significant difference between the academic performance between the senior secondary school certificate and NTC certificate students.
2. There is no statistically significant difference between the homogeneity of variance of the school certificate and NTC certificate students in terms of their performance in each of the courses.

METHODOLOGY

The study population was made up of eighty-four (84) first year technical students at the College during the 2015/2016 academic year. of these students, forty-eight (48) students entered the programme with National Technical Certificate (NTC) and thirty-six (36) students gained admission with secondary school certificates. Forty (40) students with secondary school certificates and thirty (30) students with Business certificates (representing 83.33% of the population) were used as the study sample. The selection of the sample was done alphabetically for both groups for reasons of convenience. This means that the first forty (40) and thirty (30) names on the list of each group were selected, respectively.

Five (5) courses taught in the first year of NCE Technical Programme were considered for the study. These courses were: TED 111 (Introduction to Metalwork), TED 112 (Introduction to Woodwork), TED 113 (Introduction to Electrical/Electronics), TED 114 (Introduction to Building) and TED 115 (Introduction to Automobile). The courses were chosen because they are the core/compulsory courses taken by all first-year technical students. The researcher used only five (5) core courses for reasons of convenience and with the assumption that similar results were likely to be obtained in other courses.

The researcher obtained the students' raw scores from the School of Technical Education at the end of each semester. These scores constituted the data

used for the study. Data were analysed using the arithmetic means and a t-Test of two independent group means. An f-test was used to ascertain the homogeneity of group variance.

Mean scores of NTC certificate and secondary School students were calculated for each course. They were used to determine the level of academic performance of each group in each course. The minimum passing mark of 40% and a maximum passing mark of 100 % for each course were used for the purposes of this study. This was in accordance with the passing mark for every course taught at the College. This means that group mean-scores of 40% or above constitute a passing score for the group in each course.

In testing the hypothesis, the standard deviation of both groups was calculated for each course. A t-test was used to test for the significance of differences in academic performance between the two groups. All t-tests were two-tailed and conducted at a 5% level of significance. The f-test of homogeneity of variance of both groups in each course was carried out

by calculating the f-ratio of group variance using the Hartley's F-max test for each course, with the greater variance as the numerator and smaller variance as the denominator. The tests were two- tailed and conducted at a 0.05 level of significance.

RESULTS

Determination of the Level of Academic Performance of the Groups

Table 1 demonstrates that both groups earned a passing mean score of 40 % in each of the courses, except TED 113 (Electrical/Electronics) where the secondary school certificate group had a score of 39.03%, which fell below the passing mark of 40%. The mean scores also revealed that both groups had low passing marks in TED 111, and moderate, yet passing marks in TED 112 and TED 114. The NTC certificate group earned moderate, yet passing marks in TED 113 and TED 115. However, the School Certificate group earned barely passing marks in TED 115 and failed TED 113.

Table 1. Group Mean-Scores

S/No	Course	Entry Certificate	No. of Students (N)	Total Score (T.S)	Mean Score (X)
1	TED 111 Metalwork	N T C	40	1960	49.00
		Sch. Cert.	30	1405	46.83
2	TED 112 Woodwork	NTC.	40	2741	68.53
		Sch. Cert	30	1984	66.13
3	TED 113 Electrical/Electronics	NTC	40	2095	52.38
		Sch. Cert.	30	1171	39.03
4	TED 114 Building	NTC	40	2321	58.03
		Sch. Cert.	30	1552	51.25
5	TED 115 Automotive mechanics	NTC	40	2050	51.25
		Sch Cert	30	1494	49.80

The scores further revealed that the NTC students performed better than their School Certificate counterparts in each of the courses. On the whole, the

level of academic performance of the NTC group was moderate, while the School Certificate group was low.

Test of Significant Difference in Group Performance

The results of the test of significant difference in group performance are shown in Table 2. The test was conducted with a degree of freedom (df) of 64 and probability level of $P > 0.05$, with an expected critical table value (t-value) of 2.00. The calculated t-values of the courses taken by the secondary school certificate and the NTC groups were as follows: for TED 111 Metalwork, 3.48; TED 112 Woodwork, 3.26; TED 113 Electrical/Electronics, 18.26; and TED 114 Building, 8.39. These were higher than the expected critical table value of 2.00, except in the case of TED 115 Automobile (1.81), which was less than the t-critical value of 2. Since four (4) out of the five (5) courses used for the test confirmed that there was a significant difference, the conclusion was therefore valid: there was statistically significant difference in academic performance between the secondary school Certificate and NTC certificate students. This reveals that the secondary school

certificate students performed significantly better than their City and Guilds certificate counterparts. Hence, the null hypothesis is rejected. The t-test results were considered to be reliable enough, since the sample was large. According to Usuala (1987), in order for a t-test to be reliable, there should be proper sampling and the variances of the populations should be homogenous. Also, where the sample size is 30 or more, the t-test results are not seriously affected if the distribution of the scores is not normal. Also, the t-distribution curve must be fairly close to the normal curve. Therefore, the reliability of t-test results for the five courses in the study shall depend on normality of the distribution of scores of both groups and the homogeneity of their variances (Ihiegbulam, 1992). Usuala (1987) further stated that, for larger samples of 30 or more, if the t-distribution approaches the z (normal) distribution and t-value for the means of the two independent groups, it also approaches the z-value for the same group.

Table 2. Test of Significance of Difference in Group Performance

S/No	Course	Entry Certificate	No. of Students (N)	Mean Score (X)	Std. Deviation (SD)	t-value
1	TED 111 Metalwork	Sch. Cert.	40	49	6.28	3.48 (S)
		C & G	30	46.83	6.98	
2	TED 112 Woodwork	Sch. Cert.	40	68.53	10.49	3.26 (S)
		C & G	30	66.13	8.40	
3	TED 113 Electrical/Electronics	Sch. Cert.	40	52.38	13.54	18.26 (S)
		C & G	30	39.03	11.76	
4	TED 114 Building	Sch. Cert.	40	58.03	10.22	8.39 (S)
		C & G	30	51.25	9.24	
5	TED 115 Automotive mechanics	Sch Cert	40	51.25	11.18	1.81 (NS)
		C & G	30	49.80	10.82	

Df = 64; $P > 0.05$; Expected t-Value = 2.00; NS=Not Significant; S=Significant

Test of Homogeneity of Group Variances

The results of the f-tests using the Hartley's F-max test for homogeneity of variance are presented in Table 3.

Table 3. Test of Homogeneity of Group Variance

S/No	Course	Entry Certificate	No. of Students (N)	Std. Deviation (SD)	Variance (S ²)	f-value
1	TED 111 Metalwork	NTC. Cert.	40	6.28	39.44	1.24
		Sec. Sch. Cert.	30	6.98	48.72	NS
2	TED 112 Woodwork	NTC Cert	40	10.49	110.04	1.56
		Sec. Sch. Cert.	30	8.40	70.56	NS
3	TED 113 Electrical/Electronics	NTC Cert	40	13.54	183.33	1.33
		Sec. Sch. Cert.	30	11.76	138.30	NS
4	TED 114 Building	NTC Cert.	40	10.22	104.22	1.22
		Sec. Sch. Cert.	30	9.24	85.38	NS
5	TED 115 Automotive mechanics	NTC. Cert	40	11.18	124.99	1.07
		Sec. Sch. Cert.	30	10.82	117.29	NS

$P > 0.05$; Expected f-Value = 1.84; Numerator = 39; Denominator = 29; NS = Not Significant; S = Significant

The F-max test was used to determine whether or not the assumption had been satisfied that there is no statistically significant difference in the homogeneity of variance in the performance of the NTC certificate and school certificate students in any of the courses. To determine the f-value, the larger variance among the two groups in each of the course was divided by the smaller variance. The results in Table 3 revealed that the calculated f-values of the courses for the NTC certificate and the secondary school certificate groups were: for TED 111 Metalwork, 1.24; TED 112 Woodwork, 1.56; TED 113 Electrical/Electronic, 1.33; moreover, the values for TED 114 Building (1.22) and TED 115 Automobile (1.07) were lower than the expected t-critical value of 1.84. At a probability level of $P \geq 0.05$ and with a degree of freedom (df) for the numerator of 39 and for the denominator of 29, the variance of both groups in each of the courses was therefore homogeneous and not significantly different; this implies that the calculated t-values were reliable.

DISCUSSION OF RESULTS

The findings showed that the NTC group certificate students performed relatively better than their secondary school certificate counterparts when the mean scores are considered. The significant difference in the level of academic performance between the two groups could be attributed to the difference in academic background of both groups in terms of their entry qualifications (Ihiegbulam, 1992, Geiser & Santelices, 2007); and the type of schools they attended. While one group attended secondary schools, the other attended technical colleges. This finding is consistent with results reported by Kyoshaba (2009); Considine and Zappala (2002); Ali et al. (2013) and Kwesiga (2002), who collectively and separately agreed that educational outcomes and academic performance was greatly influenced by the type of school a student attended, and that schools have an independent effect on a student's educational attainment. In addition, Miller and Birch (2007) also observed that outcomes at the university differ according to the type of high school attended.

Furthermore, Ibe-bassey (1988) also reported that the academic performance of students on end-of-semester degree examinations have been significantly influenced by the various entry qualifications of the students. The effect of entry qualifications in the form of different certificates of equivalent value for student admission to post-secondary institutions was described by Mlambo (2011); he describes that for a number of institutions, a student's admission is based on a number of different qualifications, and the result is that students receiving instruction in the same course differ widely in terms of their prior knowledge.

Ringland and Pearson, (2003) reported that although there was no significant difference in academic performance between the diploma entrants and direct 'A'-level entrants, performance in terms of the academic achievement of students prior to university studies had an effect on their performance at university to a small extent. Another factor that could contribute to the difference in the level of performance between the two groups is that the secondary school students, apart from taking many subjects at the Junior Senior Secondary School, are also exposed to curricula offerings which begin to focus their attention and interest toward future career goals (Bojuwoye, 1989). Furthermore, secondary school education broadens the students' interest, knowledge and outlook and makes them appreciate the relevance of education in their lives, through an understanding of the relationship between education and employment opportunities in the labour market (Achebe, 1986) and Bojuwoye, 1989). However, the above-mentioned report is in contrast with the NTC students, whose curriculum is rigid, pre-vocational and tailored towards a profession. Therefore, when such students, whose curriculum is not broad, but rather narrowly focused on a career, are obligated to study courses that are not traditionally in their area of study according to the NCE Technical Programme, they are bound to perform more better than their school

certificate counterparts, who had much more flexible curriculum content but when enrol into Technical programmes find it much more difficult. Secondly, the NCE Technical curriculum blends theory with practice, and this favoured the NTC certificate group more than the secondary school certificate students whose training has only practical in laboratory but no orientation in workshop practice which added to perform poorly. The t-test of significance also showed that both groups statistically differ in terms of academic performance. This finding was robust and proved reliable through the results of the homogeneity test of group variance in the five courses.

CONCLUSION

It was concluded from the findings that the level of academic performance of NTC certificate and secondary school certificate groups were unequal, with the NTC certificate group having a noticeable edge in academic performance over the secondary school certificate group. There was also a statistically significant difference in the performance of both groups in the five courses at the 5% level of significance.

RECOMMENDATIONS

Based on the findings of the study, it was recommended that:

1. Lecturers should ensure that the secondary school group improve their academic performance by improving their instructional methods in terms of practicals.
2. The Polytechnic should provide both lecturers and students with tools, equipment and other instructional aides to improve academic performance.
3. Students (especially the secondary school certificate group) should be advised to work harder to improve their academic performance particularly skills in drawing.

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