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Full Length Research Paper

Students' academic performance in the transition period before choosing areas of specialization in Nigeria Certificate Education (Technical) programme

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Abstract

The study examined the level of academic performance in the compulsory and related courses offered by all the students in technical education during the transition period of the first and second years of a three years NCE Technical programme before choosing their area of specialization. The study comprises 237 students: 22 Automobile students; 8 Building students; 21 Electrical/Electronics students, 24 Metalwork students and 4 Woodwork students admitted into year one in 2002/2003, 2003/2004 and 2004/2005 academic sessions and who transited to third year of NCE (Technical) programme in 2004/2005, 2005/2006 and 2006/2007 academic sessions, respectively. Data consisted of raw examination scores of 20 compulsory and related courses offered by all the students. The arithmetic, F-test (one-way ANOVA) and the Scheffe's test were used to analyze the data. The study established that, the Electrical/Electronic students performed better than their counterparts in Automobile, Building, Metalwork and Woodwork, and the academic performance of the five groups of students differed significantly.

Key words: Academic, performance, transition, specialization, technical, automobile, building, electrical/electronics, metalwork, woodwork.

INTRODUCTION

The Nigeria Certificate in Education (NCE) Technical Programme is a three-year post-secondary education aimed at providing technical teachers with the intellectual and professional background adequate for teaching technical subjects and making them adaptable to any changing situation in technological development (NCCE, 2008). There are basically five departments namely Automobile, Building, Electrical/Electronics, Metalwork and Woodwork Technology (NCCE, 2008). The technical teachers produced from this programme are expected to offer all the courses listed in the first and second years of the programme from all the five departments in Technical Education. The purpose is to enable the students acquire a basic knowledge of all the course in the various departments which they shall later teach in either the junior secondary school or junior technical colleges as introductory technology. The junior secondary school or junior technical college is the first three years of a post-primary school programme of six years. However, in the third year, the students shall specialize in their departments or transfer to any other department in the School of Technical Education based on the performance of the students in the related courses leading to an area of specialization to enable them fit into a profession in the industry. For the purpose of this study, the first two years of the three years NCE Technical programme where a

student may decide to continue in the department he/she was initially admitted or transfer to any other department based on academic performance is the transition period.

The students in the five different departments (Automobile, Building, Electrical/Electronics, Metalwork and Woodwork Technology) were taught all the listed compulsory courses during the first and second years of the NCE (Technical) programme even though they were admitted into the various departments. It is therefore assumed that, all the students had equal exposure to the listed courses and therefore, their performance in the related compulsory courses offered together in the transition period was not expected to differ significantly.

From the foregoing, researcher became interested in finding out how these five groups of students (Automobile, Building, Electrical/Electronics, Metalwork and Woodwork Technology) would perform academically in the listed compulsory courses during the transition period of the first and second years since transfer to any other area of specialization depends on performance in the related courses. Further, the study became relevant considering the fact that, qualitative technical teachers are the pivot of any technical education. Therefore, the level of academic performance of students going through the NCE (Technical) Programme is an index of the quality of technical teachers in the system (Ihiegbulem, 1992).

Purpose of the study

The purpose of the study is to find out:

1. the level of academic performance of the groups of students in five departments in the listed courses offered together in the first and second years, and are used for this study.
2. whether the academic performance of the five groups of students in the listed courses offered together in the first and second years shall differ significantly.

Research questions

The study shall find answers to the following research questions:

1. What are the levels of academic performance of the five groups of students in the listed compulsory courses offered together in the first and second years?
2. Will the level of academic performance of the five groups of students in the listed compulsory courses offered together in the first and second years differ?

Based on the above research questions, a null hypothesis was postulated thus: there is no statistically significant difference in the level of academic performance of students in Automobile, Building, Electrical/Electronics, Metalwork and Woodwork Technology in the listed compulsory courses offered together in the first and second years of the NCE Technical programme.

RESEARCH METHODOLOGY

The research was a descriptive survey, and was conducted in School of Technical Education, Federal College of Education (Technical), Omoku, Rivers State, Nigeria. The School of Technical education has five Departments namely: Automobile, Building, Electrical/Electronics, Metalwork and Woodwork Technology.

List of courses used for the study

A total of twenty (20) courses which were taught in the transition period of year one and two in the NCE Technical programme were use for the study. The choice of the listed courses was made because they are the core technical and related courses offered by all the students in the five departments. Table 1 shows the distribution of the courses according to semesters and year of study.

Population and sample

The study population comprises all the students admitted in the School of Technical Education in 2002/2003, 2003/2004 and 2004/2005 academic sessions who are expected to transit to third year in their departments or to transfer to other departments of their choice based on academic in choose an area of specialization in 2004/2005, 2005/2006 and 2006/2007 academic sessions respectively. A total of two hundred and sixty-nine (269) students were admitted within this period as indicated in Table 2.

The number of students who transited year three to choose their areas of specialization are shown in Table 3. A total of two hundred and thirty-seven (237) students who were in their third year of NCE (Technical) programme in 2004/2005, 2005/2006 and 2006/2007 academic sessions were selected for the study. The selection was done alphabetically for the five groups of students according to how the names appear in the mark and attendance register for convenience. That is, Automobile, 22; Building, 8; Electrical/Electronics, 21; Metalwork, 24; and Woodwork, 4.

Data collection

The data for the study were collected as follows:

1. All the students admitted in the 2002/2003 academic session who are expected to be in their third year in 2004/2005 session had their raw examination scores obtained for 2002/2003 (first year: first and second semesters), and 2003/2004 (second year: first and second semesters).
2. All the students admitted in the 2003/2004 academic session who are expected to be in their third year in 2005/2006 session had their raw examination scores obtained for 2003/2004 (first year: first and second semesters), and 2004/2005 (second year: first and second semesters).
3. All the students admitted in the 2004/2005 academic session who are expected to be in their third year in 2006/2007 session had their raw examination scores obtained for 2004/2005 (first year: first and second semester), and 2005/2006 (second year: first and second semesters).

Data analysis

Data were analyzed by calculating the mean scores of the students

Table 1. Distribution of listed courses.

Year one	Year two
First semester courses	First semester courses
TED 111- Introduction to metalwork	TED 211- Foundry and forging
TED 112-Introduction to woodwork	TED 212-Machine wood working I
TED 113-Introduction to electrical /electronics	TED 213-Electrical circuits and electrical measuring instruments
TED 114-Introduction to building construction	TED 214- Construction methods I
TED 115-Introduction to automobile	TED215-Auto braking, suspension and technology electrical systems
Second semester	Second semester
TED 121-Sheet metalwork	TED 221-Machine shop practice I
TED 122-Woodwork technology	TED 222-Woodwork design, construction and finishing
TED 123-Magnetism and electro magnetism	TED 223 Electrical and electronic devices
TED 124-Building science/materials	TED 224-Special methods
TED 125-Auto mechanics I (Transmission systems)	TED 225-Automobile engines

Source: School of Technical Education, Federal College of Education (Technical), Omoku, Rivers State, Nigeria.

Table 2. Students' year of admission and expected year to transit to third year.

Academic session	Automobile	Building	Electrical/ Electronic	Metalwork	Woodwork	Total
2002/2003	22	14	26	27	4	93
2003/2004	25	14	25	30	5	99
2004/2005	20	8	21	24	4	77
Total	67	36	72	81	13	269

Source: School of Technical Education, Federal College of Education (Technical), Omoku, Rivers State, Nigeria.

Table 3. Number of students who transited to the year to specialize.

Academic session	Automobile	Building	Electrical/ Electronic	Metalwork	Woodwork	Total
2002/2003	22	8	21	24	4	73
2003/2004	22	8	21	34	4	73
2004/2005	22	8	21	72	4	73
Total	66	24	63	72	12	219

Source: School of Technical Education, Federal College of Education (Technical), Omoku, Rivers State, Nigeria.

for the three consecutive years. The raw scores obtained for the 20 courses offered by each student in the five groups (Automobile, Building, Electrical/Electronics, Metalwork and Woodwork Technology) were summed up and divided by 20 to get the mean score for each student. The mean scores will be used to determine the level of academic performance of each of group of students in the first two years of the programme. A mean pass mark of 50% for each student for all the courses offered was used as bench mark. A mean pass mark of 50% and above indicates a good performance; and that below 50% is a poor performance.

Further, the F-test (one-way analysis of variance) was used to test for significant difference and the Scheffe's test to determine which of the groups brought about the significant difference in the level of academic performance if there was any.

RESULTS

The results in Table 4 showed that, the average mean scores of the students in Automobile, (51.69); Building (52.38); Electrical/Electronics (56.76); Metalwork (52.95)

Table 4. Group mean scores for two academic sessions for students admitted in 1991/92, 1992/93 and 1993/94 academic sessions.

	Automobile		Building		Electrical/Electronic		Metalwork		Woodwork	
	(X_1)	(X_1^2)	(X_2)	(X_2^2)	(X_3)	(X_3^2)	(X_4)	(X_4^2)	(X_5)	(X_5^2)
Total	827	42,787	419	21,975	1,192	67,771	1,271	67,457	185	8,571
No. of Students	16		8		21		24		4	
Mean score(X)	51.69		52.38		56.76		52.95		46.25	

Table 5. Test of significance in group performance.

Source	SS	df	MS	F-Cal.	Significance level	F-critical	Decision
Between groups	56.88	4	14.22	2.81	0.05	2.53	Reject H_o
Within groups	343.84	74	5.06				
Total	400.72	78					

indicated good performance while Woodwork (46.25) indicated poor performance. This result further revealed that, the Electrical/Electronic students performed better than their counterparts in other departments followed by Metalwork, Building, Automobile and woodwork respectively. This means that, students in Automobile, Building, Electrical/Electronics and Metalwork may wish to transfer to any department of their choice because they have performed above average in all the courses related to the other departments. However, the woodwork group does not have the privilege of transferring to any other department because their performance was below average.

In testing the hypothesis, the F-test (One-way ANOVA) was used to test whether there was any significant difference in the academic performance of the five groups of students. The test was conducted at 0.05 level of significance with 4 degree of freedom for numerator and 68 for the denominator respectively with an expected critical F-value of 2.53.

The results of the ANOVA test in Table 5 revealed that, the calculated F-value of 2.81 is more than the expected critical-value of 2.53. The result therefore indicated that, there was a statistically significant difference in the level of academic performance of the Automobile, Building, Electrical/Electronics, Metalwork and Woodwork Technology groups of students. Hence the hypothesis was rejected.

Further, Scheffe's test was used to determine which of the groups brought about the significant difference in the level of academic performance.

From table 6, the results of the Scheffe's test indicated that there was significant difference in level of academic performance of Electrical/Electronic group of students over their counterparts in Automobile, Building, Metalwork and Woodwork Technology. There was also significant difference in the level of academic performance of Automobile, Building, and Metalwork over Woodwork Technology. In addition, no significant difference in the level of academic performance only occurred in Automobile, Building, and Metalwork groups of students.

DISCUSSION

The findings showed that, the Electrical/Electronic students performed better than their counterparts in the other departments. While Automobile, Building and Metalwork Technology students performed above average when the mean scores were considered, the woodwork technology students performed below average.

There was also a significant difference in the level of academic performance of the groups. Further, the direction of difference showed that, the level of performance of the Electrical/Electronic students was significantly higher than the Automobile, Building, Metalwork and Woodwork Technology students. However, there was no significant difference in the performance of Automobile, Building and Metalwork Technology students. But, there was a significant difference in the performance Automobile, Building and Metalwork Technology students over their Woodwork

Table 6. Scheffe's test for direction of difference.

Comparison of groups	MS_w	MS_b	F- Cal.	F-Critical	Decision
Automobile with Building	1.00	0.95	1.05	10.12	Not significant
Automobile with Elect/Elect	25.71	0.57	45.11		Significant
Automobile with Metalwork	1.59	0.53	3.00		Not significant
Automobile with Woodwork	29.59	1.58	18.73		Significant
Building with Elect/Elect	16.56	0.87	19.07		Significant
Building with Metalwork	0.07	0.84	0.08		Not significant
Building with Woodwork	41.47	1.90	21.83		Significant
Elect/Elect with Metalwork	14.52	0.45	32.27		Significant
Elect/Elect with Woodwork	110.46	1.51	73.15		Significant
Metalwork with Woodwork	44.89	1.48	30.00		Significant

counterparts. While the other groups of students performed above average; it was the woodwork technology groups of students that performed below average. Thus, no student from the other departments will be made to transfer to woodwork technology after the transition period on account of low academic performance; and the woodwork students cannot transfer to any other department because of their below average academic performance.

It is relatively difficult to adduce reasons for the below average performance of the woodwork students when compared to above average performance their counterparts because the study was not conducted to determine the likely reasons for above or below average performance of the different groups of students but was to determine the academic performance of the students in the different departments using their examination raw scores. However, studies have established various factors such as parents' socio-economic status, entry qualification/ admission points, prior school background, peer group influence as well as students' effort as factors that may influence students' academic performance (Ali et al., 2013; Farooq et al., 2011; Dill, 2006; Considine and Zappala, 2004; Jeynes, 2002; Kwesiga, 2002; Graetz, 1995; Comb, 1985). However, the only viable assumption for the below average performance of woodwork technology students is because of their performance in the entry cut-off point as well as the low entry qualification for students seeking admission in the NCE (Technical) programme. Further, students applying for admission prefer other departments but only accepted woodwork technology as a last resort they would have also performed below average during transition period.

The admission points, entry qualification or prior academic performance to select students for admission have influenced students' academic performance at the post-secondary schools. Thus admission point which is a reflection of previous performance may influence future academic performance (Geiser and Santelices, 2007; Ali et al., 2013). Further, the Universities Admission Centre (2006) reported that, tertiary institutions in Austria have found that a selection rank based on a student's overall academic achievement is the best single predictor for tertiary success for most tertiary courses. Kyoshaba (2009) and Farooq et al. (2011) also observed that measures of prior educational performance are the most important determinant of students' performance; and this implies that the higher the previous performance, the better the students will perform academically

In addition, there have been evidences that high school grades were without doubt the best predicators of academic performance (Geiser and Santelices, 2007). In agreement, Waller and Foy (1987), Mohammad and Alhmeed (1988) opined that secondary school scores proved to be instrumental in predicting university performance.

In the same vein Mlambo (2011) reported 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 widely in terms of their prior knowledge. Learning is a cumulative process, thus a student recruited with higher entry requirements will be well prepared for the course material compared to a student admitted based on the bare minimum qualifications.

The implication of this finding is that, the level of qualitative woodwork technical teachers supplied to the world of work will be suspected. In the same vein Banjo (1974) opined that, the success or failure of any system of technical education is dependent on the quality of technical. Ihiegbulem (1992) further stated that, the level of academic performance of students going through the NCE (Technical) Programme is an index of the quality of technical teachers in the system. From the foregoing, it was imperative that, every student admitted into the NCE Technical programme should perform above average in the related courses offered in the various departments that constitute technical education so that graduates apart from effectively teaching their areas of specialization, should also be able to effectively teach Introductory Technology at the secondary schools or junior technical colleges.

Conclusion

The study established that, the Automobile, Building, Electrical/Electronics and Metalwork Technology students performed above average while the Woodwork Technology students performed below average. The implication of the finding is that, the woodwork technology department may not produce the required qualitative technical teachers to teach technical education.

It is therefore pertinent for every student admitted into the NCE Technical programme to perform above average in the courses offered in their areas of specialization and the other compulsory courses offered from the various departments during the transition period that constitute technical education. This would make graduates, apart from effectively teaching their areas of specialization, able to teach Introductory Technology at the secondary schools or junior technical colleges effectively. This is one of the major objectives of the NCE Technical programme (NCCE, 2008).

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