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A Comparative Analysis of Students' Performance in Economics in Combination with Mathematics and Other Social Science Courses in North Eastern Colleges of Education in Nigeria

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Abstract:
The study investigated the comparative analysis of student's performance in economics in combination with mathematics and other social science courses in North Eastern colleges of education in Nigeria at the Nigeria Certificate in Education (NCE) Level. The research design adopted was causal-comparative. The results of 2016/2017 economics students' sectional performance across the various subject combinations were considered. A total of 119 economics students' result across the subject combinations and levels of the Umar Suleiman College of Education Gashua and Sir Kashim Ibrahim College of Education Maiduguri were used for the study. The One-way Analysis of Variance (ANOVA) and studentized t-test were used to analyze the data (students' results) collected. The findings revealed that students' subject combination is not a determinant of students' academic performance in Economics at NCE level except at NCE 1. It also revealed that different institution is not a determinant of students' academic performance in economics. Conclusions were drawn and recommendations such as Economics students should be made to offer relevant courses in mathematics irrespective of their subject combinations and that both colleges of education should be given equal attentions among others were proffered.

Keywords: Subject combination, economics, academic performance, institution, NCE

1. Introduction

The philosophy of Nigerian Certificate in Education (NCE) Economics program is inspired by the desire to help students became intellectually informed in economics and to produce competent and effective economics teachers with good mastery of content and method, consequently develop the knowledge of the leaners [1]. The NCE Economics teacher education program states that students are expected to offer economics in combination with mathematics and other social science subject known as "subject combination". The term subject combination in Nigerian colleges of education programs refers to the two teaching subjects offered alongside with general education courses. There are subject combinations that are "single major" and some "double major". Single subject combinations are those in which students have to combine two subjects alongside with general education while double major subject combinations are those in which students take one subject carrying double weight along with general education course. This perception probably necessitated the introduction of economics single major combinations in Nigerian colleges of education; such as Economics/Mathematics, Economics/Geography, Economics/Social Studies, Economics/Computer and Economics/History among others.

1.1. Study Area

The propose area of this study covered four departments in two Colleges of Education in North Eastern Nigeria. The departments include Economics Department, Mathematics Department, Geography Department and Social Studies Department in Umar Suleiman College of Education Gashua and Sir Kashim Ibrahim College of Education Maiduguri.

1.2. Objectives of the Study

- To identify the performance of students in Nigeria Certificate in Education (NCE) in Nigerian Colleges of Education.
- To reveal the differences in academic performance of students in economics on the basis of subject combinations.
- To provide meaningful suggestions on course combinations in Nigerian Colleges of Education and recommend appropriate measures to government.

1.3. Significance of the Study

The importance of this study is to provide Colleges of Education and National Commission for Colleges of Education (NCCE) with relevant information about the state of students' performance in economics in Colleges of Education on the basis of subject combinations. It will also help to determine the possible steps to address the situation of subject combination implementation in the area. It will also provide solution to the problems of learning economics through the implementation of relevant course combinations and which would help student to improve their academic achievements.

1.4. Statement of the Problem

There is a serious concern about the poor state of teaching and learning of economics worldwide. This has made educators to focus more on economics education. Inadequacies have been observed in social science teacher education in general and economics education in particular in our Colleges of Education. This situation has apparently resulted to students" poor academic performance in the subject. Could this be as a result of students" deficient basic knowledge in mathematics? Or could it also be as a result of the nature of other subjects combined with economics.

In Colleges of Education where the "subject combination" are being implemented, there is equally a concern about how students with different subject combinations compare especially in the social sciences. Do some combinations in economics give an edge over others in economics academic performance? Do institutions difference similarly results in performance differences in economics?

1.5. Purpose of the Study

The purpose of this study is to study the comparative analysis of students' performance in economics in combination with mathematics and other social science courses in north eastern colleges of education at the NCE level.

The study specifically sought to find answers to the following question.

- Is there any difference in the academic performance of economics students in Economics courses across the various subject combinations?
- Is there a difference between the academic performance of Umar Suleiman college of education Gashua and Sir Kashim Ibrahim college of education Maiduguri students in economics courses across the various subject combinations

1.6. Research Hypotheses

- Hypotheses I There is no significant difference in the academic performance of economics students in economics course across the various subject combinations
- Hypotheses II There is no significant difference in the academic performance of Umar Suleiman college of education Gashua and Sir Kashim Ibrahim college of education Maiduguri economics students in economics course across the various levels

2. Literature Review

In most of the studies as will be seen in the review of relevant literature, quite a number of researches has been carried out on comparative analysis but for student's performance in economics in combination with mathematics and other social science courses, have rarely been studied. [2] carried out a study to compare the academic achievement of students in science and arts courses in tertiary institution of Yobe state with particular reference to male and female students. The sample for the study comprised of a total of sixty students. Thirty students each were randomly selected from boys and girls (15 science and 15 arts students from each group). Four null hypotheses regarding the cross check of achievement between science and arts courses by male and female were tested. The mean, standard deviation and variance and the difference between mean (t-test statistics) was used for data analysis. The result revealed that the female science students showed significant better result than female arts. Male science students showed significant better result than male arts while female science and female arts students were significantly better than their male counterparts. In a study conducted by [3] it was hypothesized that no difference exists between male and female performance in undergraduate accounting courses. The subjects used for the study were first year male and female accounting undergraduate students of the University of Benin, Nigeria who sat for Introductory Financial Accounting Courses namely, Introduction to Financial Accounting I & II in 2004/2005 to 2007/2008 academic session. The letter grades of A, B, C, D, E & F with a weight of five, four, three, two, one and zero respectively were used as measures of academic performance. The t-test statistics for the difference between two independent samples was adopted for the study. The study revealed that there is no significant difference between academic performance of male and female Accounting students in undergraduate accounting courses. [4] compared students' academic performance in Mathematics and Principles of Account using scores obtained by students in the subjects in two academic sessions 2008/2009 and 2009/2010. The outcome of the study showed that the relationship between academic performance in Mathematics and Principles of Account was insignificant. [5] investigated students' academic performance in public examination in Secondary Schools in Ondo and Ekiti States, Nigeria. The research design was descriptive. The population was composed of all 281 Secondary Schools in Ondo State and the 171 Secondary Schools in Ekiti State. The stratified random sampling technique was used for the selection of 240 and 146 Secondary Schools from Ondo and Ekiti State respectively. The instrument for data collection was an inventory and the data collected were analysed using percentages, Chi-square test and the t-test. Result of the analysis revealed that the performance of students at both Junior Secondary Certificate (JSC) and Senior Secondary

Certificate (SSC) examinations were low. There was no significant difference in the performance of students from the two States in JSC but there exist significant differences in their performance at SSC level. [6] compared the academic achievement of students from monogamous and polygamous families in Offa, Kwara State. The research design used was causal-comparative. The sample for the study was made up of 200 Senior Secondary one (SS1) students (100 from monogamous and 100 from polygamous families) selected from four schools in Offa using the stratified simple random sampling technique. A format was used for collecting data on academic achievement of students and the data analysed using t-test statistics. The result of the analysis showed that a significant difference exists between the academic achievement of student from monogamous homes and those from polygamous homes with students from monogamous homes achieving higher mean scores than their polygamous counterparts. [7] examined the influence of subject combinations on preservice mathematics teachers" examination performance in Nigeria. Also, [8] examined the influence of subject combination on the performance of students in mathematics in Nigeria Colleges of Education. The results revealed that mathematics students performed better than other students. In their view, [9], assert that achievement of students in mathematics was a critical fitter in the physical sciences and technology. In another study, [10], investigated the effects of gender on subject combinations as factors of student's performance in economics and found no significant difference between the sexes in performance in the subject. Sex is another important factor that has been considered in the study of students" performance in physics.

3. Research Methodology

3.1. Research Design

The research design adopted for this study is causal-comparative design. In this design, the researchers attempt to link the already existing influence or observation to some variables as causal effect. It seeks to establish relationship between one variable and another. The independent variable is inherently non-manipulative because its manifestation has already occurred.

3.2. Data Collection

The results of 2017/2018 economics students" sectional performance (Cumulative Grade Point Average (CGPA)) in economics across the various subject combinations and levels were obtained from the office of the Head of Departments of economics in Umar Suleiman college of education Gashua (USC) and Sir Kashim Ibrahim college of education Maiduguri (SKC). These results represent the CGPA of 3, 2, 1 years for NCE III, II, I respectively, and represent the results from 2015/2016, 2016/2017, 2017/2018 sessions. The tabular presentation of the total number of students whose results were used for the study is shown in Table 1.

The students' combinations with economics are geography, social studies, and mathematics. The GPA of each of the students was considered and the average GPA of students in economics/mathematics (EM); economics/geography (EG); and economics/social studies (ES) were computed. Also computed were the average GPA for Umar Suleiman college of education Gashua (USC) and Sir Kashim Ibrahim college of education Maiduguri (SKC) economics students across the subject's combinations in NCE I; NCE I, NCE III.

4. Analysis of Results

The data collected from the four departments (Economics, Mathematics, Geography and Social Studies) of the two Colleges of Education were analyzed using One Way Analysis of Variance (ANOVA) and T-test analysis.

Sub. Comb.	NCE I			NCE II			NCE III			Comb.
	Institutions			Institutions			Institutions			
	USC	SKC	Total	USC	SKC	Total	USC	SKC	Total	Total
Eco/Math (EM)	6	4	10	7	1	8	5	2	7	25
Eco/ Geo (EG)	9	3	12	8	6	14	10	6	16	42
Eco/Sos (ES)	11	4	15	13	6	19	8	10	18	52
Level/Institution total	26	11	37	28	13	41	23	18	41	119

Table 1: Subject Combination by Level and Institution of Students for 2017/2018 Academic Session

4.1. Results of the Study

From Table 1, 37 students of NCE I were considered with study with 10 in EM, (6 USC, 4 SKC); 12 in (EG) with 9 USC, 3 SKC, 15 in ES, with 11 USC, 4 SKC. For NCE II, results of 41 students were considered 8 in EM with 7 USC, 1 SKC; 14 in EG with 8 USC, 6 SKC, 19 in ES with 13 USC, 6 SKC. In the case of NCE III results of 41 students were also considered. 7 in EM with 5 USC, 2 SKC, 16 in EG with 10 USC, 6 SKC, 18 in ES with 8 USC, 10 SKC. The total number of students whose results were considered was 119.

Level	Mean GPA by Subj. Comb.				Mean (CGPA) by Sex					
					USC			SKC		
	EM	EG	ES	CGPA			SD₁			SD₂
						X₁			X₂	
NCE I	2.5	1.15	2.75	2.13		2.25	1.48		1.87	1.13
NCE II	2.28	1.39	1.98	1.88		2.71	1.01		2.18	0.76
NCE III	2.68	2.37	2.33	2.46		2.71	1.01		2.18	0.70

Table 2: Mean Grade Point Average (GPA) by Level, Subject Combinations and Institution

Table 2 shows the result of the data in answer to the research questions 1 and 2. It indicates that students who have mathematics as second subject performed better than those that have Social studies or Geography as their second subjects expect in NCE 1 where the mean GPA of the students in higher than that of students that have mathematics and Geography as their second combinations. The table also revealed that the Cumulative Grade Point Average (CGPA) of NCE III Economics across the subject combination is higher than that of NCE II and NCE I. The mean CGPA of USC Economics students is slightly higher that of SKC Economics students across the subject combinations in all the levels.

- Hypotheses I: There is no significance difference in the performance of economics students across the various subject combinations.

Variable	Source of variation	Ss	df	Ms	f-ratio	f-critical
NCE I	Between Group	17.65	2	8.84		
EM, EG and ES Student	Within Group	53.88	34	1.58		
	Total	71.55	36			
NCE II	Between Group	134.8	2	67.41		
					-12.89	3.28
EM, EG and ES Student	Within Group	198.65	38	5.23		
	Total	63.84	40			
NCE III	Between Group	1.03	2	0.52		
					0.55	3.28
EM, EG and ES Student	Within Group	35.25	38	0.94		
	Total	36.78	40			

Table 3: One-way Analysis of Variance EM, EG and ES; NCE I, NCE II, and NCE III, students compared in performance
*Not Significant at P< 0.05

For NCE I, the f-ratio, 5.59 is greater than f-critical, 4.13. This implies that there is significant difference ($P<0.05$) in the academic performance of economics students across the various subject combinations. This implies that the subject combination is a determinant of students" academic performance in economics.

In the case of NCE II Economics students, the f-ratio obtained, -12.89 is less than f-critical. This shows that there is no significant difference at 0.05 confidence level across the various subject combinations. Through the mean CGPA of Economics/Mathematics is found to be greater than the mean CGPA of Economics/Social studies and Economics/Geography Students, but the difference was not found to be statistically significant.

Also, in NCE III, the F-ratios obtained, 0.5 is less than the F-critical, 3.28. This implies that the students" academic performance in economics across the various subject combinations is not statistically significant. The null hypothesis is therefore retained for NCE III and NCE II while it is rejected in the case of NCE I.

- Hypothesis 2: There is no significant difference between the academic performance of Umar Suleiman college of education Gashua and Sir Kashim Ibrahim college of education Maiduguri economics students across the various level.

Institution	N	Mean	Sd1/Inx	Sd2/level	df	t-cal	t-critical	Decision
NCE I								
USC	26	2.25	1.48	0.45	35	0.78	2.042	NS*
SKC	11	1.37	1.13					
NCE II								
USC	28	2.71	1.01	0.28	39	1.89	2.042	NS*
SKC	13	2.17	0.76					
NCE III								
USC	23	2.71	1.01	0.28	39	1.89	2.042	NS*
SKC	18	2.18	0.70					

Table 4: T-Test Analysis of the Difference Between the Mean Scores of Umar Suleiman College of Education Gashua and Sir Kashim Ibrahim College of Education Maiduguri Students in NCE I, NCE II and NCE III
*Not Significant at the p<0.05

Table 4 Reveals that the mean CGPA of USC students is greater than that of SKC students across NCE I, NCE II and NCE III, but the differences were not found to be statistically significant ($p<0.05$) in all the cases. The null hypothesis,

which states that there is no significant difference between the academic performance of USC students and SKC students across the various levels, was retained.

5. Discussion of Results

Evidence from the research findings revealed that the students" subject combinations do not significantly influence academic performance in economics. Across the various subject combinations, no statistically significant differences were found in economics academic performance among the students of the different combinations for NCE II and NCE III Economics, except for NCE I where there was a significant difference in the academic performance of economics students across the various subject combinations. However, the mean scores of students who have mathematics as their second combination was found to be slightly higher (though not statistically significant) at all level and across subject combinations, except also in NCE I where students in social studies/economics performed higher than students in math/economics and economics/geography. These results seem to agree with the findings of [8], [7], [9], that mathematics students performed better than other students across subject combinations in social sciences. Though no significant difference was found between the academic performance of Umar Suleiman college of education Gashua and Sir Kashim Ibrahim college of education Maiduguri economics students across the levels (NCE I, NCE II, NCE III), the mean scores of Umar Suleiman college of education Gashua economics students across the levels were found to be slightly higher than their Sir Kashim Ibrahim college of education Maiduguri counterpart. This finding agrees with the findings of the studies of [11]; [12]; [13], who did not find any significant difference between the academic performance of economics students after comparing selected tertiary institution However, the result is in contract to the findings of [14]; [15], who found a significant difference in favour of one institution than other institution economics students.

5.1. Conclusion

This study underscores the importance of mathematics at start of NCE economics program (NCE I) in enhancing students' performance in the social sciences and in economics in particular. Economics as a subject is characterized with mathematics and manipulations and the interpretation of concepts using mathematical notations. However, the influence of mathematics gradually pales as students" progress in their study to levels I and II. Mathematics cannot therefore be separated from economics and other social sciences. Therefore, economics students need a strong mathematics background in order to do well in their study of economics.

5.2. Recommendations

Based on the findings and their implications the following recommendations were made:
- Students offering economics at NCE level should be made to offer relevant courses in mathematics as the main problem most students have in economics class is calculation.
- Both colleges of education students should be carried along in economics class as the findings did not call for separate method of teaching on the basis of institution.
- Students admitted to read economics in College of Education should have at least credit pass in mathematics. Students having subject combinations other than mathematics should be given remedial classes in mathematics so as to enhance their knowledge in manipulation and calculation.
- Those employed to teach economics in our Colleges of Education should have a teaching qualification and experience that would enable them understand the principle of teaching and learning that would help them to handle economics students with difference combinations.

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