

CORRELATION OF BUSINESS EDUCATION STUDENTS' ENTRY GRADES IN MATHEMATICS AND ACADEMIC ACHIEVEMENT IN FINANCIAL ACCOUNTING IN COLLEGES OF EDUCATION IN ONDO STATE

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Abstract

The study examined the correlation between business education students' entry grades in Mathematics and their academic achievement in Financial Accounting in Colleges of Education in Ondo State. Three research questions guided the study, and two hypotheses were tested at 0.05 level of significance. Ex-post facto research design and correlation study were employed for the study. The population of the study comprised of 727 NCE Part II students in three Colleges of Education in Ondo State. The sample size of the study was 685 students. Academic record and checklist were used for data collection. Data collected were analysed using frequency count, simple percentages and mean to answer the research questions while Pearson Product Moment Correlation Co-efficient was used to test hypothesis 1 and regression analysis was used to test hypothesis 2. Result obtained showed that in the 2012/2013, 2014/2015 and 2015/2016 academic sessions over 98% of the students passed with credit as the minimum grade and that in the 2012/2013 academic session, the mean score of students in harmattan semester was 49.92 ± 12.02 while that of rain semester was 51.95 ± 11.74 ; in the 2014/2015 academic session, the mean score of students in harmattan semester was 50.95 ± 15.06 while that of rain semester was 48.07 ± 13.63 ; and in the 2015/2016 academic session, the mean score of students in harmattan semester was 49.01 ± 10.62 while that of rain semester was 48.31 ± 11.25 . Findings revealed that there was no significant relationship between business education students' Ordinary level scores in Mathematics and their academic achievement in Financial Accounting and that entry grade predicted students' academic achievement in Financial Accounting. It was therefore recommended among others that secondary school principals should conduct orientation programmes to enlighten students on the need to develop interest in Mathematics so as to improve their future academic achievement in Financial Accounting and Business Education Courses in general.

Introduction

Business Education is an integral part of vocational education. It is a conglomerate of courses that is concerned with the acquisition, development and inculcation of the proper values for the survival of the individual and the society (Oladunjoye, 2016). In Nigeria, Business education is taught at different levels of education with different nomenclature. At junior secondary level, the programme is taught as business studies with book-keeping, commerce, typewriting, shorthand and office practice, as component parts. In the senior secondary level, business education is taught as Financial Accounting, Commerce, Marketing, Office practice, Economics, and entrepreneurship (practicals). At the tertiary level, the programme is operated by colleges of education, polytechnics and universities as a three-year, two-year or four-year course, depending on the nature of the programme enrolled for (Ezeani & Ogundola, 2016). Due to the robust nature of the programme, the National Commission for Colleges of Education (2020) divided the business education programme into four specialized options of Accounting Education, Entrepreneurship Education, Marketing Education and Office Technology and Management Education (formerly known as secretarial option).

Financial Accounting is a part of Business Education programme. It is a concept in which financial information of a business is communicated to the interested parties so that they could understand the financial strength of the organization. Miller (2012) defined Financial Accounting as the art of recording, classifying and summarizing in a significant manner and in terms of money transactions and events which are in part at least, of financial character and interpreting the results thereof. Financial Accounting is one of the vocational subjects and an aspect of Business Studies offered in Secondary Schools. The subject was introduced because of the need to keep proper record of a business both in the private and public sectors with the aim of ascertaining profit made and ensuring proper accountability by the managements controlling the business. The subject was included in Secondary Schools' curriculum by the National Policy on Education for the student to have basic knowledge of accounting which will equip students for day-to-day menial financial transactions and other societal needs.

It also helps to classify and record monetary transactions and present the financial result of the activities of an entity to show business performance. The skills Financial Accounting provides cannot be over emphasized; as they provide financial information for internal users, finance analysts, employees and for those that are interested in stock and profit sharing ventures. Business owners through Financial Accounting can share information about the business strength and weakness with their employees. Financial Accounting deals directly with business skills, business knowledge and facts which are necessary to understand economic and social institutions. It provides information needed by a company to maintain profitability. It is a part of information system within an organization which explains double – entry bookkeeping and how data are identified, recorded and presented as information in the way required by the users of financial information.

Grades acquired in prerequisite subjects at secondary schools are some of the basic requirements for obtaining admission into tertiary institutions in Nigeria. It is expected that the grades obtained in prerequisite subjects at secondary school level can promote academic progress with regards to a more in-depth understanding and performance of students into their area of specialization. This assumption made all the programmes of studies in tertiary institutions in Nigeria to emphasize at least credits grades in some relevant subjects. Based on this, most business educators maintained that any student opting for business education in tertiary institutions should have at least credit in Mathematics and Principles of Accounting. It is believed that the knowledge and skills acquired at secondary school in these subjects will help to develop in students' critical thinking, problem solving, team work, time-management and writing skills. A search into importance of prerequisite subjects on students shows that it is very crucial for students' success at tertiary institutions. Scholars such as Alan and Stephen cited in Ibrahim and Usman (2015) reported that prerequisite knowledge in the areas of Mathematics, Economics, and Accounting are of great importance to the finance students. This opinion was also shared by Adamu and Sani (2012) who reported that basic skills and knowledge gained at secondary school helps to develop in students the understanding, critical thinking, and technical skills to meet the educational challenges at higher education. Hence, students' prior performances in prerequisite subjects at secondary school tend to lead to success of students in tertiary institutions.

Mathematics is recognized as one of the science subjects which is used in everyday life. It is designed to enable students to develop problem-solving abilities and apply knowledge gained in their daily living. Right from early childhood, students are introduced to Mathematical concepts, methods and language through variety of mathematical tools like counters, toys and research based teaching strategies. They are guided to see the connections and differences of ideas within Mathematics and other subjects. Effective use of Mathematical language may enable a child to be accurate in other subjects. Mathematics differs from Accounting as a pattern of science and seeks out patterns whether found in numbers, space, science, computers, imaginary and abstract while Accounting deals with recording and reporting of financial transactions, including the origination of transactions, its recognition, processing and summary in the financial statement. Students' background characteristics in terms of entry grades in their major areas of studies are fundamental to their success in higher education.

Ordinarily, good entry grades in Mathematics at the secondary school stage may predict good performance in Financial Accounting. Abdullahi and Abdulkadri (2016) observed that students with good result in Mathematics have the potentials of performing better in advanced Financial Accounting in Colleges of education. Students require a range of generic skills, reasoning and problem solving skills in

Mathematics together with the ability to apply these skills which are also applicable to Financial Accounting; students should be able to apply Mathematics skills and knowledge gained to solve questions in Financial Accounting.

Financial Accounting is a very important term to the modern society. The tremendous growth of the business world which increased the complexities of accounting and financial reporting requires skillful personnel to teach the subject or handle the financial records. As a result, students' performance at tertiary institutions is considered as the basis to determine competent personnel to teach or manage the financial records. Business education programme in Colleges of Education teaches Accounting as a course from part I to III, namely, Principles of Booking and Accounting in NCE Year I, Financial Accounting in NCE Year II and Advance Financial Accounting in NCE Year III. Students must have at least 45% before he or she could pass the course (NCCE, 2020). The cumulative results of students in these courses reflects the learners' ability in financial accounting, hence, grades in the courses will be used as yardstick to measure students' academic performance in financial accounting.

The discipline of Accounting and Mathematics are concerned with accurate numerical measurement of precisely defined operational skills. Jubril (2011) discovered that accounting and mathematics have resemblance within the educational settings. Approach in mathematics and accounting could serve as the foundation for student's success in accounting. Despite the importance attached to mathematics on students opting for business education, the general complain of students with myopic knowledge of the importance of prerequisite entry skills is that emphasizing on it is a strategy for admission denial and have no impact on students' academic achievement.

Aciro, Onen, Malinga, Ezati, and Openjuru (2021) revealed the existence of positive, negative, and mixed correlations respectively between the entry grades and the academic performance of university students and stated that there was yet no consensus over whether pre-university academic performances of students predict their performances at university level; thus, indicating the need for further research. Similarly, Aidoo-Buameh and Ayagre (2013) discovered that both positive and negative relationships exist between pre-university and university academic performance. Their study revealed that there was a significant relationship between core mathematics and accounting at pre-university level and performance of undergraduate accounting students' performance. Adeyemi (2013) compared the performance of final year Bachelor of Education Degrees students who entered the university from three different examination bodies in Nigeria which are West Africa Examination Council (WAEC), the National Examinations Council (NECO) and the National Business and Technical Examinations Board (NABTEB). The result indicated that students' performances in SSCE strongly determine their academic success in tertiary institution.

A study conducted by Wambugu and Emeke (2017) on relationship between entry qualification and academic performance in undergraduate science courses revealed that there was a significant positive correlation between entry qualification (Secondary School Certificate) and academic performance though it is not the only variable that can predict performance. Another study by Hussaini, Bawa and Sani (2022) established that there was no significant relationship between entry qualification and academic performance among NCE Business Education (Double major) students for 2015/2016 academic year in Shehu Shagari College of Education, Sokoto.

In a nutshell, Mathematics skills and knowledge may be good factors in the success of Business Education students. Shaban (2015) concluded that there is a significant positive relationship between mathematics' subjects (Business Mathematics, Business Statistics, Quantitative Methods in Management, and Principles of Accounting) and the accumulative average of the accounting students. It seems that the knowledge of Mathematics may influence on students academic achievement in business education. This may be one of the reasons why National Commission for Colleges of Education (NCCE) emphasizes at least credit pass in Mathematics for students opting for Business Education. As a matter of fact, almost all Vocational and Technical Education based courses required a credit pass in Mathematics as the minimum entry grade.

One of the variables that may possibly influence students' academic achievement is gender. Gender refers to all the characteristics of male and female which describe behaviours and attributes expected of individuals on the basis of being a male or female in a given society. Personal orientation and thinking style of male and female students may play a crucial role in their academic achievement in school.

The findings of Yousef (2011) with respect to the effects of gender on the achievement of business students showed that there was a difference between the achievement of the male and those of the female students while Nwalado and Oru (2016) found that there was no significant difference in the mean achievement scores of male and female students in achievement test.

The studies have shown contradictions and lack of clear trend on relationship between entry qualification and students' academic achievement and influence of gender on students' academic achievement. Most of these studies were carried out without emphasis on entry level grades and gender. Hence, the need for this study.

Statement of the Problem

Mathematics is a foundation to all subjects that have elements of calculation; it is also a pre-requisite for admitting students into business education programme in Colleges of Education in Nigeria. Business education programme includes options in entrepreneurship education, marketing education, office technology and management education (OTM) and accounting education. Accounting has close relationship with Mathematics in almost all aspects, for example, dual aspect concept which is a basic concept of accounting is expressed as a mathematical equation, known as accounting equation. Accounting computations such as computation of depreciation, determination of loan installment system require Mathematics knowledge to compute them.

Despite this entry requirement, students' academic achievement in accounting at the colleges of education seem to be discouraging, for example a research conducted by Shaban (2015) found out that almost two-third of the graduated student of the accounting option fall around average grades. Similarly, the researchers observed that the failure rate in Colleges of Education in Ondo State in 2012/2013, 2014/2015 and 2015/2016 academic session was 40.7%, 37.4% and 55% respectively. The observed failure could be because of several individual and non-individual factors. To address this, authors and stakeholders in the educational industry have made frantic concerted and solo efforts which includes identifying student factors, school factors and home factors in students' academic achievement in accounting education. However, from the authors observation and contact with students in tertiary institution, there seems to be no significant improvement in students' academic achievement. Entry level grades of certain subjects such as Mathematics, English language, Economics, Commerce, Financial Accounting and Government are prerequisite to studying Business Education and related courses. As a way of contributing to the present efforts geared at improving students' academic achievement and enhancing sustainable education development, this study intends to establish the relationship between entry level grades (in secondary school certificate examination) in Mathematics and students' academic achievement in Financial Accounting in Colleges of Education in Ondo State.

Purpose of the Study

The study examined the correlation of business education students' entry grades in Mathematics and their academic achievement in Financial Accounting in Colleges of Education in Ondo State. Specifically, the study determined:

1. the entry grades in Mathematics at Ordinary Level of students admitted into Nigeria Certificate of Education programme, Nigeria. Business education in Colleges of Education Ondo State in 2012/2013, 2014/2015 and 2015/2016 academic sessions.
2. the scores of the students in Financial Accounting for 2012/2013, 2014/2015 and 2015/2016 academic sessions.
3. the relationship between Ordinary level grade in Mathematics and students' academic achievement in Financial Accounting.

Research Questions

The following research questions were raised to guide the study:

1. What are the entry grades in Mathematics at Ordinary Level of students admitted into NCE Business Education 2012/2013, 2014/2015 and 2015/2016?
2. What are the academic achievements in Nigerian Certificate of Education, Business Education students admitted in 2012/2013, 2014/2015 and 2015/2016 in Financial Accounting.?

3. What is the relationship between students' ordinary level scores in Mathematics and their academic achievements in Financial Accounting?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance

1. There is no significant relationship between student's Ordinary level scores in Mathematics and students' academic achievements in Financial Accounting.
2. Male and Female NCE Business Education students' scores in Ordinary Level Mathematics do not significantly predict their academic achievements in Financial Accounting.

Method

Ex-post facto research design and correlation study were employed for the study. The population of the study comprised of 727 NCE Part II business education students in three Colleges of Education in Ondo State: Adeyemi College of Education, Ondo, All States College of Education, Ero and Bethel College of Education, Akure. The sample size of the study was 685 business education students in the three colleges. Total enumeration was used to select all NCE Part II business education students who offered financial accounting in the three Colleges. The instrument used for data collection was students' academic records in ordinary level mathematics and corresponding academic records in Financial Accounting. The Ordinary Level results of NCE II students in 2012/2013, 2014/2015 and 2015/2016 academic sessions were correlated with their scores in Financial Accounting. The data collected were students' WAEC, NECO and GCE examinations results in Mathematics which are standardized test that has passed through several levels of scrutiny and the validity had been established by experts. The researchers ensured that data collected were valid, credible, reliable and that subjects were correctly identified. Data collected were analysed using frequency count, simple percentages and mean to answer the research questions while Pearson Product Moment Correlation Co-efficient was used to test hypothesis 1 and regression analysis was used to test hypothesis 2 at 0.05 level of significance, where p-value is less than or equal to 0.05, then null hypotheses was rejected, otherwise, it was retained.

Results

Research Question One

What are the entry grades in Mathematics at Ordinary Level of students admitted into NCE Business Education 2012/2013, 2014/2015 and 2015/2016?

Table 1: Entry grades in Mathematics at Ordinary Level of students admitted into NCE Business Education 2012/2013, 2014/2015 and 2015/2016

Entry Grades in Mathematics		Session			Total
		2012/2013	2014/2015	2015/2016	
Grade	A ₁ (75 and above)	3(2.0)	0(0.0)	0(0.0)	3(0.4)
	B ₂ (70-74)	1(0.7)	6(1.4)	2(1.7)	9(1.3)
	B ₃ (65-69)	23(15.3)	9(2.2)	20(16.7)	52(7.6)
	C ₄ (60-64)	15(10.0)	46(11.1)	7(5.8)	68(9.9)
	C ₅ (55-59)	26(17.3)	149(35.9)	9(7.5)	184(26.9)
	C ₆ (50-54)	80(53.3)	204(49.2)	82(68.3)	366(53.4)
	D ₇ (45-49)	1(0.7)	1(0.2)	0(0.0)	2(0.3)
	E ₈ (40-44)	1(0.7)	0(0.0)	0(0.0)	1(0.2)
Total		150(100.0)	415(100.0)	120(100.0)	685(100.0)

Source: Researchers' Computation (2023)

Table 1 presents the summary of NCE Business Education students' grade in ordinary level Mathematics. The table revealed that in the 2012/2013, 2014/2015 and 2015/2016 over 98% of the students passed with credit as the minimum grade. However, the table revealed that in 2012/2013 session only 2% of the students had an A, 16% had a B while 80.6% had a C. In 2014/2015 session, 3.6% of the students had a B, 96.2% of the students had a C. Similarly, in 2015/2016 session, 18.4% of the students had a B and 81.6% of the students had a C.

Research Question Two

What are the academic achievements in Nigerian Certificate of Education, Business Education students admitted in 2012/2013, 2014/2015 and 2015/2016 in Financial Accounting?

Table 2: Academic achievements in Nigerian Certificate of Education, Business Education students admitted in 2012/2013, 2014/2015 and 2015/2016 in Financial Accounting

Session	Harmattan	Rain
2012/2013	49.92±12.02	51.95±11.74
2014/2015	50.95±15.06	48.07±13.63
2015/2016	49.01±10.62	48.31±11.25
Total	50.38±13.74	48.96±12.92

Source: Researchers' Computation (2023)

Table 2 revealed that in the 2012/2013 academic session, the mean score of students in harmattan semester was 49.92±12.02 while that of rain semester was 51.95±11.74. In the 2014/2015 academic session, the mean score of students in harmattan semester was 50.95±15.06 while that of rain semester was 48.07±13.63. In the 2015/2016 academic session, the mean score of students in harmattan semester was 49.01±10.62 while that of rain semester was 48.31±11.25.

Research Question Three

What is the relationship between student ordinary level scores in Mathematics and their academic achievements in Financial Accounting?

Table 3: Academic Achievement of Students in Financial Accounting by Ordinary Level Scores in Mathematics

		Average Score in Financial Accounting						Total
		A	B	C	D	E	F	
Grade	A ₁ (75 and above)	00 (0.0)	01 (0.9)	01 (0.4)	00 (0.0)	00 (0.0)	01 (1.0)	03 (0.4)
	B ₂ (70-74)	00 (0.0)	00 (0.0)	03 (1.3)	03 (2.5)	01 (1.0)	0 (2.0)	09 (1.3)
	B ₃ (65-69)	02 (7.7)	12 (10.8)	10 (4.5)	7 (5.8)	12 (11.9)	09 (8.8)	52 (7.6)
	C ₄ (60-64)	04 (15.4)	17 (15.3)	14 (6.3)	11 (9.1)	13 (12.9)	09 (8.8)	68 (9.9)
	C ₅ (55-59)	09 (34.6)	25 (22.5)	55 (24.6)	33 (27.3)	26 (25.7)	36 (35.3)	184 (26.9)
	C ₆ (50-54)	11 (42.3)	55 (49.6)	140 (62.5)	66 (54.5)	49 (48.5)	45 (44.1)	366 (53.4)
	D ₇ (45-49)	00 (0.0)	01 (0.9)	01 (0.4)	00 (0.0)	00 (0.0)	00 (0.0)	02 (0.3)
	E ₈ (40-44)	00 (0.0)	00 (0.0)	00 (0.0)	01 (0.8)	00 (0.0)	00 (0.0)	01 (0.2)
Total		26 (100.0)	111 (100.0)	224 (100.0)	121 (100.0)	101 (100.0)	102 (100.0)	685 (100.0)

Source: Researchers' Computation (2023)

Table 3 revealed that 42.3% of the students that performed excellently in Financial Accounting had C₆ in ordinary level mathematics. Only 7.7% had a B in ordinary level Mathematics and still managed to perform excellently in Financial Accounting. Similarly, 49.6% of the respondents that score a B in Financial Accounting had last credit in ordinary level Mathematics. Also, for all other grades (C, D, E and F) in Financial Accounting, students had last credit in ordinary level Mathematics.

Hypothesis One

There is no significant relationship between student's Ordinary level scores in Mathematics and students' academic achievement in Financial Accounting.

Table 4: Correlation matrix showing the relationship between students' Ordinary level scores in Mathematics and students' academic achievement in Financial Accounting

		Entry Grade	Academic Achievement
Entry Grade	R	1	
	p-value		
Academic	R	-.074	1
Achievement	p-value	.052	

Source: Researchers' Computation (2023)

Table 4 presents the relationship between students' ordinary level scores in Mathematics and students' academic achievement in Financial accounting. The table revealed that the relationship between entry grade in ordinary level scores in Mathematics and students' academic achievement in Financial Accounting is negative and insignificant. Hence, the null hypothesis which states that there is no significant relationship between student's Ordinary level scores in Mathematics and students' academic achievement in Financial Accounting is accepted.

Hypothesis Two:

Male and Female NCE Business Education students' scores in Ordinary Level Mathematics do not significantly predict their academic achievements in Financial Accounting.

Table 5: Summary of regression analysis showing independent variables predicting students' academic achievement

Model		Unstandardized Coefficients		Standardized Coefficients	T	p-value
		B	Std. Error	β		
1	(Constant)	57.774	4.56		12.66	
	Entry Grade	-.15	.08	-.074	-1.95	.05
	Gender	.27	.86	.012	.32	.75

a. Dependent Variable: Academic Achievement in Financial Accounting

Source: Researchers' Computation (2023)

Table 5 presents the independent variables predicting students' academic achievement in Financial Accounting. The table revealed that entry grade ($t = -1.95$, $p = 0.05$) predicted students' academic achievement in Financial Accounting.

The prediction equation is given by $y = 57.774 - 0.15x_1$

where:

y = students' academic achievement (dependent variable)

x_1 = entry grade

In essence, male and female NCE Business Education students' scores in Ordinary Level Mathematics did not significantly predict their academic achievements in Financial Accounting.

Discussion of Findings

Findings of the study showed that almost all students passed ordinary level Mathematics at credit level in all the sessions examined. This is so because, a credit pass in Mathematics is one of the entry requirements for studying Business Education in Colleges of Education in Nigeria. This finding revealed that there is strict adherence to entry qualifications as stated by NCCE (2020) that a minimum of five (5) credits in not more than two sittings including Mathematics and English should be used for admission into Business Education programme. The findings corroborate Aciro, Onen, Malinga, Ezati, and Openjuru (2021) who stated that globally, entry to higher education institutions is predominantly based on prior attainment of good grades. As a result, candidates admitted to higher institutions must have attained certain minimum requirements for specific academic programmes but should have also favourably ranked among

the applicants since everyone is admitted based on his/her grades (Wambugu & Emeke, 2013; Aidoo-Buameh & Ayagre, 2013). Further findings revealed that in all the academic sessions examined in the study, students' academic achievement in Financial Accounting was about average. The findings are in line with Shaban (2015) who found out that almost two-third of the graduated student of the accounting option fall around average grades.

The results of the study revealed that there is no significant relationship between student's Ordinary level scores in Mathematics and students' academic achievement in Financial Accounting. The findings agree with Hussaini, Bawa and Sani (2022) who found out that there was no significant relationship between entry qualification and academic performance among NCE Business Education students. However, the findings disagree with Abdullahi and Abdulkadri (2016) who observed that students with good result in Mathematics have the potentials of performing better in advanced Financial Accounting in Colleges of education. Similarly, the findings disagree with Jubril (2011) who found significant relationship between entry grades in Mathematics and ability of solving problems in Financial Accounting within a stipulated time. Findings from this study also contravene the assertion made by Shaban (2015) that there is significant positive relationship between mathematics subjects and the cumulative average of the accounting students.

Although, it was observed that, there was no significant relationship between ordinary level result in Mathematics and academic achievement in Financial Accounting, the study found that entry grade was a good predictor of students' academic achievement in Financial Accounting. The finding is in line with Adamu and Sani (2012) who found out that secondary school grades in Accounting and Mathematics have influence on performance of students who plan to make a career out of Accounting.

Conclusion

Consequent upon the findings of the study, it was concluded that there is no significant relationship between business education student's Ordinary level grades in Mathematics and their academic achievement in Financial Accounting. Entry grades (including credit pass in Mathematics) serve as fundamental predictor of students' achievement in all courses vis-à-vis Financial Accounting. This is because entry grade was observed to predict students' academic achievement.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Secondary school Principals should conduct orientation programmes to enlighten students on the need to develop interest in Mathematics so as to improve their future academic performance in Financial Accounting and Business Education courses;
2. the government and examination bodies (WAEC, NECO, NABTEB and JAMB) should help to ensure that the process of conducting entry qualification examinations into tertiary institutions should be credible and excellent;
3. there is a need for teachers to employ simplified methods of teaching that will enhance students' comprehension of core subjects like Mathematics. A highly motivated student by his instructors will develop interest and perform optimally;
4. the Colleges of Education should make more allowance to train and retrain business educators through seminars, workshops, short refresher courses and other professional development opportunities to sharpen their academic and professional competence. This will in turn lead to improvement in the academic achievement of students.

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