



Correlation between Mathematics Grades in the Senior School Certificate Examination and Student Achievement in CSC 200

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ABSTRACT

The research explored the correlation between mathematics grades obtained in the Senior School Certificate Examination (SSCE) and the scores achieved by students in Computer Science 200 (CSC) at the university level. The primary objective was to ascertain the predictive value of SSCE mathematics grades on student performance in the CSC 200 course. This study adopted a correlational research design and involved a participant pool of 83 students, comprising 31 males and 52 females, who were enrolled as second-year undergraduates (200 level) at Delta State University, Abraka. The students undertook the Computer Science 200 examination using computer-based testing (CBT) during the academic sessions of 2017/2018 and 2020/2021. Their performance scores in the CSC 200 course were gathered for subsequent analysis. The research addressed five distinct research inquiries and subjected three null hypotheses to testing at a significance level of 0.05. The analytical approach employed the Product Moment Correlation Coefficient (PPMC). Contrary to expectations, the outcomes revealed no significant correlation between mathematics grades and students' achievements in CSC 200. The observed slight superiority of male students over their female counterparts in terms of performance proved to be statistically marginal and lacked practical significance. It was evident that factors beyond mathematics grades were influential in shaping student success in the CSC 200 course. As a result, it is plausible that various other variables contributed to students' performance outcomes in CSC 200. Given these findings, the study suggests that future investigations encompass larger and more diverse sample sizes to obtain a comprehensive understanding of the underlying dynamics.

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INTRODUCTION

It is common in research undertakings to find out the extent or how well one stage or factor determines another level or future endeavour. For instance, Omodera (2010) examined pre-service qualification as a measure of classroom behaviours of science teachers in senior secondary schools. Similarly, Ossai (2016) and Ossai (2020) investigated the extent of relationships between scores obtained by students in research methods and undergraduate projects, and students score on plain questions and word problems.

In this present study, this researchers examined the relationship between school certificate grade in mathematics and undergraduate students' scores in a general computer science course taken in the second year (200 level) by undergraduate students in Delta State University, Abraka, Nigeria. A core course of two units, computer science 200 (CSC 200) is designed to make students appreciate the rudiments of computer studies. The course is introductory in nature.

Students are required to take a computer-based test after receiving lectures on the course. The quantitative nature of the

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questions, perhaps, makes students complain. It stands to reason therefore, that the level of pass in mathematics at the School Certificate School Examination (SSCE) may have an influence in students' performance in the CSC 200 examination.

To gain admission into Delta State University, Abraka a prospective student is expected to possess at least five credits at the SSCE from either the West Africa Senior Certificate Examination (WASSCE) or the National Examination Council (NECO). In some cases, depending on the course of study, credit passes can be obtained from the National Business and Technical Examinations Board (NABTEB). Besides this category of students, there are also other groups of students admitted through direct entry (Ossai, 2020). With specific reference to the department of Guidance and Counselling (where this study was conducted), such students spend three years in the University compared to their counterparts who spend four years. For the purpose of this investigation, only grades obtained from WASSCE or NECO were used.

Studies (e.g. Jaschik, 2020; Maire, 2014; Schaffhauser, 2017) have shown that high school grades strongly predict students' performance in college. However, Wojeriki (2023), cited by Huddleston (2023) reported that grades obtained in high school do not matter.

Similarly, Umeoduagu (2023) examined the relationship between entry qualification and academic achievement of students' degree examination. The investigation focused on the department of mathematics at College of Education, Agbor, and an affiliate centre of Delta State University Abraka. The study was aimed at correlating student's mathematics grade at the SSCE and the National Certification in Education (NCE) with degree examination in mathematics. The study was correlational. A sample size of 80 students was drawn from a population of students enrolled in 2006/2007 and 2007/2008 session. Results approved by the College Academic Board and students grade at the SSCE were used in the study. Data analysis was done using chi-square test of independence. The result showed that there was no significant relationship between SSCE grade in

mathematics and degree examination in mathematics. However, there was a significant relationship in students' performance at NCE and degree examination. The no-significant relationship between S from a population of students enrolled in 2006/2007 and 2007/2008 session. Results approved by the College Academic Board and Students grade at the SSCE were used in the study. Data analysis was done using chi-square test of independence. The result showed that there was no significant relationship between SSCE grade in mathematics and degree examination in mathematics. However, there was a significant relationship in students' performance at NCE and degree examination. The no-significant relationship between SSCE grade and degree examination. In mathematics is a pointer to the fact that it does not matter one's grade at that level. This is in line with the report of Huddleston (2023) that high school grades are in material. It is however, contrary to Sulphcy, et al. (2018) who reported a strong relationship between admission grades and student's academic performance in college.

It is expected that the quantitative nature of mathematics will suggest that the subject is a prerequisite for performance in computer studies. In particular, some of the questions presented for students to respond to at CSC 200 examination appear to be SSCE questions in mathematics. Besides grappling with what response is appropriate to an item, students are faced with the challenges of using the computer in the examination. Some of the causes of students' poor performance in mathematics are known to be poor attitude of students (Mohd, et. al., 2011; Yusof, et. al., 2019), inability to tackle word problems in mathematics (Dayal & Chandra), location (Ossai & Efeludu, 2023), dimensionality of items (Ossai, 2015) and inadequate teaching materials, class size as well as unqualified teachers (Udonsa, 2015).

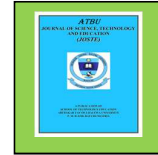
The relationship between mathematics and computer science is better appreciated from the way Oloronke, et al. (2018) viewed computer science. According to the scholars, computer science involves technicalities, mathematical concepts and logical reasoning. They reported that the

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mathematical nature of computer science discourage many people (mostly women) from pursuing the career. Gender disparity in the field of computer science was reported by Pappas, et al. (2016). The scholars observed in a study concerning gender difference in computer science education that male students show more interest in computer science compared to their female counterpart. Du and Wimer (2019) also reported that males are more exposed to computer. The superiority of men to women in computer studies was also demonstrated by Ossai (2018). In the study comparing the effectiveness of the t-test, Mann-Whitney U test and the median test, it was found that the three tests of significance showed that the male students did better than their female counterparts in CSC 200 examination.

In this present study, two research questions seeking the mean achievement of male and female students in CSC 200 were generated. Two research questions were also raised to find out how the mathematics grades of each sex correlated with their achievements in CSC 200. The fifth research question was on the relationship between the mathematics grades of all the students and their performance on CSC 200. Three hypotheses were formulated. The first two hypotheses sought the significance in the relationship between the

0 – 44	0
45 – 49	2
50 – 59	3
60 – 69	4
70 – 100	5

RESULTS

Results were presented as follows:

Research Question One: What is the mean achievement of male students in CSC 200?

Table 1: Mean score of male students in CSC 200.

Variable	N	Score	\bar{X}	Letter Grade
Male	31	85	2.74	C

Table 1 shows the mean score of male students in CSC 200. This translates to “C” grade according to the University’s grading

mathematics grades of the two categories of students and their performance in CSC 200. The overall relationship was sought by the third hypothesis.

METHODOLOGY

The study was correlational. A sample size of 83 students was drawn from a population of 186 students for 2020/2021 and 2017/2018 sessions. Five research questions and three null hypotheses directed the study. Students’ scores on CSC 200 examination administered in the two sessions under investigation were collected from the department of Guidance and Counselling. The scores originated from the computer-based test (CBT) to which the students responded. The mean and the Pearson Product Moment Correlation coefficient (PPMC) were used to answer the research questions. Further information on the research questions was given through coefficient of determination. The PPMC was also used to test the two null hypotheses at .05 level of significance. The school certificate grades in mathematics were classified into two groups, namely, 1 and 2. Mathematics grades A1, B2 and B3 were coded as 1 while grades C4, C5 and C6 were coded as 2. The University’s grading system was modified as follows:

system. This also ranges from 50 -59 scores out of 100 marks.

Research Question Two: What is the mean achievement of female students in CSC 200.

Table 2: Mean score of female students in CSC 200.

Variable	N	Score	\bar{X}	Letter Grade
Female	52	142	2.73	C

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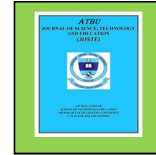


Table 2 shows the mean score of female students in CSC 200. This translates to "C" grade in line with the grading pattern of the University. This also ranges from 50 – 59 scores out of 100 marks.

Research Question Three: What is the relationship between the mathematics grades of male students and their achievement in CSC 200?

Table 3: Relationship between the mathematics grades and CSC 200 scores for male students

Variable	N	r	r ²
Mathematics grades	31	-0.0920	0.8

Table 3 shows that the relationship between the mathematics grades of male students and their scores in CSC 200 is -0.0920. The coefficient of determination is 0.8% indicating that less than 1% of achievement in CSC 200 can be attributed to mathematics grades.

Research Question Four: What is the relationship between the mathematics grades of female students and their achievement in CSC 200?

Table 4: Relationship between the mathematics grades and CSC 200 scores for female students.

Variable	N	r	r ²
Mathematics grades	52	-0.1298	0.0168

Table 4 shows that the relationship between the mathematics grades of female students and their CSC 200 scores is -0.1298. The co-efficient of determination is 0.0168 indicating that about 2% of students' achievement in CSC 200 can be attributed to mathematics grades.

achievement in CSC 200 can be attributed to mathematics grades.

Research Question Five: What is the relationship between the mathematics grades of students and their achievement in CSC 200 scores?

Table 5: Relationship between students' mathematics grades and their CSC 200 scores.

Variable	N	r	r ²
Mathematics grades	83	-.1075	0.0115

Table 5 shows that the relationship between students' mathematics grades and their CSC 200 scores is -.1075. The co-efficient of determination is 0.0115 indicating that a little above 1% of students achievement in CSC 200 can be attributed to mathematics grades.

Hypothesis One: There is no significant relationship between male students' mathematics grades and their achievement in CSC 200.

Table 6: Product Moment Correlation of student's Mathematics grades and their achievement in CSC 200.

Variable	N	r-cal.	df	r-crit.	Remarks
Mathematics grades	31	-0.0920	29	0.349	Not Sig.

The table shows that r-calculated value is less than the table value at $\alpha = .05$ level of significance and $df = 29$. The null hypothesis was therefore upheld.

Hypothesis Two: There is no significant relationship between female students mathematics grades and their achievement in CSC 200.

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Table 7: Relationship between mathematics grades and CSC 200 scores for female students.

Variable	N	r-cal.	df	r-crit.	Remarks
Mathematics grades	52	-0.1298	29	0.2732	Not Sig.

The table shows that r-calculated is less than the table value at $df = 50$ and α level of significance. This prompted the retention of the null hypothesis.

Hypothesis Three: There is no significant relationship between students' mathematics grades and their achievement in CSC 200 scores.

Table 8: Product Moment Correlation Co-efficient of students' mathematics in CSC 200.

Variable	N	r-cal.	df	r-crit.	remarks
Mathematics Grades	83	-0.1075	81	0.2178	Not Sig.

The table shows that r-calculated is less than the table value at $df = 81$ and $\alpha = .05$ level of significance. Thus, the null hypothesis was upheld.

that grades obtained in high school do not really matter.

DISCUSSION OF FINDINGS

The purpose of this study was to find out the relationship between SSCE mathematics grades and students' achievement in CSC 200 in Delta State University Abraka. This guided the discussion of findings as follows.

However, the result of this study contradicts the findings of Sulphrey et al (2018); Maire (2014), Schaffhauser (2017) and Jaschik (2020). They separately held that high school grades strongly predicted academic achievement in Colleges and Universities.

In CSC 200, male and female students obtained mean scores of 2.74 and 2.73 points respectively. They both translated to average scores of grade C, in line with the University's grading system. The respective relationships between mathematics grades and CSC scores are respectively -0.0920 and -0.1298 for males and females. Thus SSCE grades accounted for about 1% and 2% of achievement in CSC by male and female students respectively. Generally, mathematics grades accounted for 1.15% of student's achievement in CSC 200.

Factors other than SSCE mathematics grades must have contributed to students' achievement in CSC 200. Such factors could be test anxiety (Nunez-Pena, et al, 2016) guessing tendencies (Ossai, 2015 Ossai & Enwefa, 2020) and students' attitude to problem solving (Mohd, et al., 2011).

CONCLUSION AND RECOMMENDATIONS

One expects that the mathematics nature of CSC 200 would have meant that a good grade or a low grade in mathematics would lead to a corresponding achievement in CSC 200. However, the reverse appears to be the case.

This study has shown that students' mathematics grades at the SSCE did not predict achievement in CSC 200. Although the mean achievements by both sexes were average, the edge of the male students over their female counterparts was marginal and insignificant. Factors other than mathematics grades must have accounted for student achievement in CSC 200. This research was conducted using a single department. Further researches involving larger samples are hereby suggested.

The finding from this study is in agreement with the works of Umeoduagu (2010) and Huddleston (2023). While Umeoduagu reported no significant relationship between SSCE mathematics performance and degree examination in mathematics, Huddleston (2023) cited Wojcicki as positing

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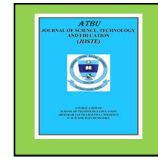
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