

UNIVERSITY OF CAPE COAST

A COMPARATIVE STUDY OF GENDER PERFORMANCE IN THE CORE
SUBJECTS OF THE SENIOR SECONDARY SCHOOL CERTIFICATE
EXAMINATION (2001 - 2005)

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By

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A Dissertation submitted to the Department of Mathematics and
Statistics of the School of Physical Sciences, Faculty of Science,
University of Cape Coast in partial fulfillment of the requirements for
the award of Master of Science Degree in Statistics.

MARCH, 2007

DECLARATION

CANDIDATE'S DECLARATION

I hereby declare that this dissertation is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature:.....*Rosemond*.....

Date:.....*4th Oct: 2007*.....

Name: *Rosemond*.....*Wilson*.....

SUPERVISOR'S DECLARATION

I hereby declare that the preparation and presentation of the dissertation were supervised in accordance with the guidelines on supervision of dissertation laid down by the University of Cape Coast.

Supervisor's Signature:.....*N. K. Howard*.....

Date:.....*4th October 2007*.....

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ABSTRACT

This project is based on the results of candidates who sat for the Senior Secondary School Certificate Examination (SSSCE) conducted by the West African Examinations Council (WAEC).

The main objective of this project is to determine whether performance in SSSCE core subjects namely Core Mathematics, Integrated Science, English Language and Social Studies for the five-year period from 2001 to 2005 depended on sex. The data were obtained from the West African Examinations Council for this research.

Preliminary analysis was conducted on the data using frequency tables, percentages and multiple bar charts.

In order to establish concrete statistical evidence, the chi-square (χ^2) test for independence was used and the results revealed that for the five-year period in all the four subjects, the males performed better than the females.

ACKNOWLEDGEMENTS

I first extend my sincere gratitude to Dr. Nathaniel K. Howard, my supervisor, for tenderly directing my steps to the end of the project. Not only did he constructively criticize my ideas but he also offered invaluable suggestions without which this project would only have been an “unfinished business”. To him, I say a very big THANK YOU.

My gratitude also goes to Miss Janet Brakoh for assisting in the printing of this work.

Finally, I am grateful to all those who rendered assistance in various ways to make this project a success.

DEDICATION

*This project work is dedicated to my children, Yorick and Stella Wilson
and to my dear husband, Daniel Wilson.*

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CHAPTER ONE

INTRODUCTION

Background

In recent years, there has been a lot of attention in the world, over the need to facilitate improved performance of students. Furthermore, increasing the number of females in formal education is of major concern. At the World Conference on Women in Geneva in 1990 a declaration that highlighted the need to give priority to female education was adopted. This declaration also provided the world, especially developing countries, the opportunity to accelerate action to improve upon the existing effort in female education by paying particular attention to the issue of identified gender disparities including performance in science, mathematics and related subjects.

As the world is becoming more and more complex, there is the need for a nation to develop its human resource. Education tends to improve a mother's general knowledge on sound health practices; female education is thus very important for national development. These and other reasons such as the perception that performance in examinations is linked to the sex of the candidate necessitated the need to study gender performance in the SSSCE core subjects, which form one of the main requirements for entry into any tertiary institutions.

In Ghana the focus on quality education is not only aimed at improving

performance but also getting more and more females interested in improving upon their knowledge by moving up the academic ladder. For a candidate to gain admission into a tertiary institution in Ghana, he or she must obtain at least a credit (Grade D) in the four core subjects – English Language, Core Mathematics, Integrated Science and Social Studies. Again, the candidate must perform creditably well in three elective subjects, depending on the programme of study.

The West African Examinations Council (WAEC) is the sole examining body responsible for the conduct of the Senior Secondary School Certificate Examination (SSSCE) on behalf of the Ministry of Education. This examination is administered to school candidates in the third year of the Senior Secondary School programme. The award of the SSSCE certificate is based on two component scores namely, Continuous Assessment Scores (CASS) in the schools and the external examinations scores (TASS) conducted by The West African Examinations Council. The ratio of CASS to TASS is 30:70. For the award of Senior Secondary School certificate, school candidates must enter and sit for all the core subjects (English Language, Core Mathematics, Integrated Science and Social Studies) and three elective subjects from one of these programmes; Science, General Arts, Visual Arts, Business and Technical programmes. Results (performance) at SSSCE are stated in terms of letter grades from A to F. Grade A is the highest and grade F is the least. For the purpose of our study we will concentrate on grades A to E, which are the passes.

The interpretation of various grades are shown below:

Table1: Interpretation of grades

| Grade | Interpretation |
|--------------|-----------------------|
| A | Excellent |
| B | Very Good |
| C | Good |
| D | Credit |
| E | Pass |
| F | Fail |

Objectives

The objective of the study is to determine whether the performances in the various core subjects of the SSSCE depend on the sex of the candidate. The study also reviewed issues of equity and factors that contribute to gender differences. These factors include equality of formal opportunities and experiences that promote educational achievement.

Research questions

1. Does the performance of candidates in SSSCE Core Mathematics depend on Sex ?
2. Does the performance of candidates in SSSCE English Language depend on Sex ?
3. Does the performance of candidates in SSSCE Integrated Science depend on Sex ?

4. Does the performance of candidates in SSSCE Social Studies depend on Sex?

Hypotheses

These research questions were transformed into the following hypotheses:

1. H_0 : Performance in Core Mathematics and Sex are independent.

H_1 : Performance in Core Mathematics and Sex are not independent.

2. H_0 : Performance in English Language and Sex are independent.

H_1 : Performance in English Language and Sex are not independent.

3. H_0 : Performance in Integrated Science and Sex are independent.

H_1 : Performance in Integrated Science and Sex are not independent.

4. H_0 : Performance in Social Studies and Sex are independent.

H_1 : Performance in Social Studies and Sex are not independent.

Literature review

The Wesley College Centre for Research on Women (1992) also stated that gender gaps in school performance have only in recent years begun to receive more attention in scholarly research and in 1989, a study analyzing 138 articles on education reform published in professional journals from 1983 to 1987, found gender bias to be discussed in only one percent of the articles addressing the factors related to gender that are involved in school performance. It is important to ensure that all students will succeed to the best of their ability. Also, national and statewide educational goals, which ignore gender, are equivalent to "solutions designed to meet everyone's needs which risk meeting no one's".

The Wesley College Centre for Research on Women (1992) further

reported that the few studies that have addressed the interaction of gender with school performance in the past decades have traditionally focused on teenage pregnancy and its connection to dropout rate as the main problems faced by females; but this cannot be the only factor associated with differential achievement of males and females.

Further studies by Sadker (1987) revealed that gender gaps manifest themselves in several ways and it is important for policy makers, practitioners and the public to be made aware of gender differences in school performance.

Hartnett and Heneveld (1993) also found out that gender differences can be an excellent source for informing country-level policy discussions about female participation in education, especially if they are formulated into a country profile. They went on to report that, there is a growing pressure to expand junior and senior secondary school education. This demand comes from the youth, parents and communities. Furthermore, African economies need more graduates from secondary and higher levels of education to foster social and economic growth.

Hartnett and Heneveld (1993) also investigated the many efforts made at promoting gender equity in education. Most of the efforts have been restricted to the basic education but it is important to pay attention to secondary education since there is evidence of gender differences in terms of access, retention and performance.

All these studies show that although gender issues are talked about in schools, it appears that little is actually being done and it will be important to

study the differences in gender performance in senior secondary education.

Data collection

The data used for this study is secondary data obtained from the West African Examinations Council. It covers the period 2001-2005. The data consists of Senior Secondary School Certificate Examination results of candidates in Ghana for the four core subjects - Core Mathematics, English Language, Integrated Science and Social Studies.

Outline of dissertation

This dissertation comprises five chapters. Chapter One which introduces the study, has to do with the background, objective, research questions, relevant literature review and a description of the data used for the study. Chapter Two consists of the review of the statistical methods used for the study.

Chapter Three is about the preliminary analysis of data. In this chapter a descriptive summary of the data has been made using frequency distribution tables, multiple bar charts and percentages.

Chapter Four contains an analysis of the data using chi-square (χ^2) test for independence and a comparison of the results obtained from the test.

Finally, in chapter Five, we discuss and draw conclusions from the analysis made.

CHAPTER TWO

REVIEW OF METHODS

Introduction

This study makes use of the chi-square test for independence, which is usually used in works involving performance assessment. This chapter therefore considers some theories or principles that the chi-square test for independence employs.

Chi-square test for independence

The chi-squared test for independence deals with two qualitative variables, each of which is classified into a number of mutually exclusive classes and the classes arranged in a two-way table. Two-way tables are often called contingency tables because the alternative hypothesis in the test is that the two variables are independent. That is, there is contingency between the two variables (Gordor & Howard, 2001).

Suppose that each of n randomly selected elements is classified into two dimensions and suppose that the result of the two-way classification is a contingency table having r rows and c columns. Let:

n_{ij} = the cell frequency corresponding to row i and column j of the contingency

table (that is, the number of elements classified in row i and column j)

r_i = the row total for row i in the contingency table.

c_j = the column total for column j in the contingency table.

$e_{ij} = r_i c_j / n$ = the estimated number of elements that would be classified as statistically independent.

Test statistic

The test statistic is the chi-square (χ^2) distribution with a significant level $\alpha = 0.05$.

The number of degrees of freedom is given by $(r - 1)(c - 1)$.

The critical region for the test at 0.05 significant level is therefore

$\chi^2 \geq \chi^2_{0.05} [(r - 1)(c - 1)]$. The critical value is traced from statistical table (Spiegel, 1992).

Test of hypothesis

In general the null and alternative hypotheses are

H_0 : The two variables under consideration are independent.

H_1 : The two variables under consideration are not independent.

where H_0 is the null hypothesis and H_1 is the alternative hypothesis.

H_0 is rejected if chi-square value calculated is greater than the critical value. In conclusion, we say that the two variables under consideration are not independent.

Calculation of the expected frequency and the chi-square

Test Statistic

(i). The expected frequency for any cell can be determined by

$$f_e = \frac{(\text{Row total}) (\text{Column total})}{\text{Grand Total}}$$

Therefore, f_e is the expected frequency for a cell (Healey, 2002).

We compute the value of the chi-square by using the formula;

$$\chi^2 = \frac{\sum (f_o - f_e)^2}{f_e}$$

CHAPTER THREE

PRELIMINARY ANALYSIS

In this chapter, the grades of males and females in the core subjects in Senior Secondary Certificate Examination were examined using summary statistics such as percentage passes by gender in the various subjects and multiple bar charts. In this study also we will classify grades A and B as above average performance, grades C and D as average performance and grade E as below average performance.

Summary statistics

In this section, we shall summarize the data for the study in Appendix A as follows:

Table 2: Percentage passes of candidates by gender in the various grades in 2001

| Subject | Sex | GRADE | | | | |
|--------------------|--------|-------|-------|-------|-------|-------|
| | | A | B | C | D | E |
| Core Mathematics | Male | 8.65 | 10.91 | 7.28 | 8.1 | 20.54 |
| | Female | 3.96 | 5.75 | 4.52 | 6.14 | 19.31 |
| Integrated Science | Male | 2.35 | 7.77 | 7.61 | 10.98 | 28.99 |
| | Female | 1.13 | 3.76 | 3.75 | 6.56 | 25.82 |
| English Language | Male | 0.66 | 5.93 | 7.59 | 12.34 | 35.55 |
| | Female | 1.16 | 6.52 | 7.49 | 10.92 | 33.68 |
| Social Studies | Male | 0.11 | 7.91 | 13.61 | 21.35 | 35.99 |
| | Female | 0.05 | 5.41 | 10.67 | 18.55 | 38.28 |

From Table 2, a fifth (20%) of the males performed above average in Core Mathematics for the year 2001. Correspondingly 10% of the females also performed above average. However, 15 out of 100 males performed averagely compared to 11 out of 100 females. Twenty-one percent of males performed below average whereas 19% of the females also performed below average in Core Mathematics. This indicates that about twice the number of females performed above average as males. Many males and females also obtained grade E in Core Mathematics in 2001.

In Table 2 again, a few of the males (10%) as compared to very few of the females (5%) performed above average in Integrated Science. Here also, twice as many females as males performed above average. Most of the males (21%) performed below average as compared to 26% of females in Integrated Science. This shows that more than a fifth of both males and females performed poorly in Integrated Science in 2001.

The same table reveals that in the case of English Language, very few of the males and females performed above average that is, 7% and 8% respectively with only 1% of them obtaining grade A. Thirty-six percent of the males obtained grade E as against 34% of the females in English Language. This shows that more than a third of both males and females performed below average in this subject.

From Table 2, in 2001, 36% of the males had passes (grade E) as against 38% of the females in Social Studies. This shows that more than a third of the males and females performed poorly in Social Studies. However, 8% of the males

males and females performed poorly in Social Studies. However, 8% of the males and 5% of the females also performed above average with almost none of them obtaining the excellent grade. Here also we see that very few males and females performed above average in Social Studies in 2001.

Table 3: Percentage passes of candidates by gender in the various grades in 2002

| Subject | Sex | GRADE | | | | |
|--------------------|--------|-------|-------|-------|-------|-------|
| | | A | B | C | D | E |
| Core Mathematics | Male | 6.2 | 10.02 | 7.45 | 9.35 | 23.88 |
| | Female | 3.1 | 5.28 | 4.43 | 6.57 | 21.08 |
| Integrated Science | Male | 2.97 | 9.84 | 8.68 | 13.43 | 33.24 |
| | Female | 1.28 | 4.61 | 5.01 | 9.3 | 31.61 |
| English Language | Male | 0.51 | 4.56 | 5.98 | 11.1 | 35.46 |
| | Female | 0.67 | 5.05 | 5.86 | 10.54 | 34.11 |
| Social Studies | Male | 0.47 | 14.87 | 17.21 | 22.29 | 30.8 |
| | Female | 0.36 | 10.43 | 14.12 | 20.62 | 34.52 |

Table 3 shows that 16% of males performed above average in Core Mathematics and correspondingly 8% of the females performed above average. Here the percentage of males who obtained grade A and grade B was twice that of the females and this shows that more of the males performed above average than the females. A look at the table also reveals that 16% of the males performed averagely as compared to the 11% of the females in Core Mathematics and many males (24%) obtained grade E as compared to 21% of the females who obtained grade E. This shows that more than a fifth of the candidates performed below

average in Core Mathematics in 2002.

Table 3 shows that in 2002, 22% of the males had average pass in Integrated Science as compared to 14% of females who performed averagely. Here also, the percentage of males who had average pass was almost twice that of the females and that many males obtained good grades than females. From Table 3, most of the candidates, 33% of males and 32% of females performed below average in Integrated Science. This indicates that in 2002, more than a third of both males and females performed poorly in Integrated Science.

The table also shows that the performances of males and females in English Language were very close –58% passes for males and 57% passes for females in the year 2002. Most of the males and females also performed below average, that is, 35% and 34% respectively and this constitutes a third of them performing poorly in English Language.

In the case of Social Studies in 2002, 15% of the males performed above average as compared to 11% of the females and 31% of the males also performed below average in comparison with 35% of the females in Social Studies. This shows that many females performed below average than males. However, almost none of the candidates (0.47% for males and 0.36% of females) performed excellently in Social Studies.

Table 4: Percentage passes of candidates by gender in the various grades in 2003

| Subject | Sex | GRADE | | | | |
|--------------------|--------|-------|-------|-------|-------|-------|
| | | A | B | C | D | E |
| Core Mathematics | Male | 8.77 | 11.52 | 7.78 | 9.55 | 23.01 |
| | Female | 4.37 | 6.28 | 5.08 | 7.65 | 21.34 |
| Integrated Science | Male | 4.34 | 12.58 | 10.5 | 15.49 | 33.28 |
| | Female | 2.31 | 6.71 | 6.54 | 12.21 | 35.05 |
| English Language | Male | 0.74 | 4.54 | 6.03 | 10.03 | 34.11 |
| | Female | 0.74 | 4.97 | 5.49 | 9.04 | 31.35 |
| Social Studies | Male | 0.05 | 6.71 | 14.73 | 19.89 | 37.28 |
| | Female | 0.05 | 5.04 | 10.9 | 17.28 | 38.68 |

From Table 4, in Core Mathematics 21% of the males performed above average as against 11% of females. This shows that the percentage of males who performed above average in Core Mathematics were twice as that of females and that many males obtained good grades than females. The table further indicates that a larger percentage of males (23%) and females (21%) performed below average. This constitutes nearly a fifth of males and females who sat for the examination. It indicates that many males and females performed poorly in Core Mathematics in 2003.

In the case of Integrated Science for the same year, 17% of the males performed above average as compared to 9% of the females. However, 26% of the males and 19% of the females performed averagely and more than a third of both males and females, that is, 33% and 35% respectively performed below average. This shows that most of the candidates performed poorly in Integrated

Science.

Table 4 reveals that for English Language, only 16% and 15% of males and females respectively, performed above average. Many males (34%) and many females (31%) performed below average. This shows that more than a third of the candidates performed below average and so performance of candidates in English Language in 2003 was also very poor.

For Social Studies, only 7% of the males and 5% of the females performed above average. However, more than a third of the males and females, that is, 37% and 39% respectively performed below average. This indicates that many of the candidates performed poorly in Social Studies. Also almost none of the males and females performed excellently in this subject.

Table 5: Percentage passes of candidates by gender in the various grades in 2004.

| Subject | Sex | GRADE | | | | |
|--------------------|--------|-------|-------|-------|-------|-------|
| | | A | B | C | D | E |
| Core Mathematics | Male | 15.24 | 15.95 | 10.06 | 12.72 | 23.87 |
| | Female | 7.88 | 12.08 | 8.90 | 12.85 | 27.78 |
| Integrated Science | Male | 3.81 | 10.12 | 9.07 | 12.76 | 32.33 |
| | Female | 1.88 | 5.25 | 5.64 | 9.07 | 31.56 |
| English Language | Male | 0.74 | 5.93 | 7.49 | 12.12 | 37.39 |
| | Female | 0.94 | 6.48 | 7.15 | 11.48 | 36.1 |
| Social Studies | Male | 0.09 | 10.98 | 19.37 | 26.55 | 33.91 |
| | Female | 0.10 | 7.35 | 15.57 | 24.58 | 39.71 |

Table 5 indicates that in 2004, 31% of males and 20% of the females

performed below average whereas more than a fourth of the females (28%) also performed below average. This shows that many of the females performed poorly in the Core Mathematics as compared to the males. Twenty-three percent of the males and 22% of females also performed averagely in Core Mathematics in 2004.

Table 5 further reveals that in the case of Integrated Science, 14% of the males as against 7% of females performed above average. Here also, the percentage of males who had above average was almost twice that of the females and that many males obtained better grades than females.

It was also observed that 32% of both males and females, about a third of them, performed below average in Integrated Science. However, 22% of males performed averagely as compared to 15% of the females. This shows that many of the males performed better than the females in Integrated Science in 2004.

In the case of English Language Table 5 indicates that performances in the various grade levels for both males and females were almost the same. That is, 7% of both males and females performed above average, 19% of males and 18% of females had average passes and 37% of males and 36% of females performed below average.

Here, more than a third of the males and females performed poorly in English Language.

For Social Studies, 11% of males as against 7% of females performed above average with almost none of them obtaining grade A. However, 46% of the males and 41% of the females performed averagely and more than a third of the

males and 41% of the females performed averagely and more than a third of the males (34%) and females (40%) performed below average. It shows that most of the males and females performed below average in Social Studies in 2004.

Table 6: Percentage passes of candidates by gender in the various grades in 2005.

| Subject | Sex | GRADE | | | | |
|--------------------|--------|-------|-------|-------|-------|-------|
| | | A | B | C | D | E |
| Core Mathematics | Male | 8.2 | 11.25 | 8.04 | 11.56 | 27.46 |
| | Female | 4.31 | 7.18 | 5.79 | 9.08 | 26.69 |
| Integrated Science | Male | 3.75 | 15.48 | 14.96 | 19.31 | 34.38 |
| | Female | 1.96 | 8.9 | 10.36 | 17.0 | 41.7 |
| English Language | Male | 0.3 | 4.38 | 6.46 | 11.31 | 36.88 |
| | Female | 0.73 | 4.38 | 5.65 | 10.16 | 36.02 |
| Social Studies | Male | 0.57 | 22.13 | 26.32 | 24.38 | 22.4 |
| | Female | 0.24 | 16.56 | 23.41 | 25.36 | 28.39 |

Table 6 shows that 19% of the males performed above average as compared to 11% of the females who also perform above average in Core Mathematics. More than a fourth (27%) of both males and females performed below average in Core Mathematics. This indicates that many males and females performed poorly in Core Mathematics.

In the case of Integrated Science, 19% of the males and 11% of the females performed above average. However, very few of the males (4%) and females (2%) performed excellently. More than a third of the males (34%) and females (42%) performed below average in Integrated Science in 2005. This

shows that many males and females performed poorly in Integrated Science.

The table further shows that the level of performances of both males and females were almost the same in English Language. Very few of the males and females (4%) and (5%) respectively performed above average. One percent of the females performed excellently whereas almost none of the males (0.3%) obtained grade A. Seventeen percent of males and 16% of females performed averagely. However, more than a third of the males and females, 37% and 36% respectively, performed below average in English Language in 2005.

For the case of Social Studies, very few of the males (1%) and almost none of the females (0.24%) obtained grade A. However, half of the males (50%) as compared to 48% of females performed averagely in Social Studies. Table 6, shows that many males (22%) and females (28%) also performed below average in Social Studies in 2005.

Graphical representations of the data

This part of the study explores the data by giving graphical representations of the data obtained. Multiple bar charts of number of males and females in percentage verses grades are drawn. This covers each of the four core subjects for the five-year period under consideration.

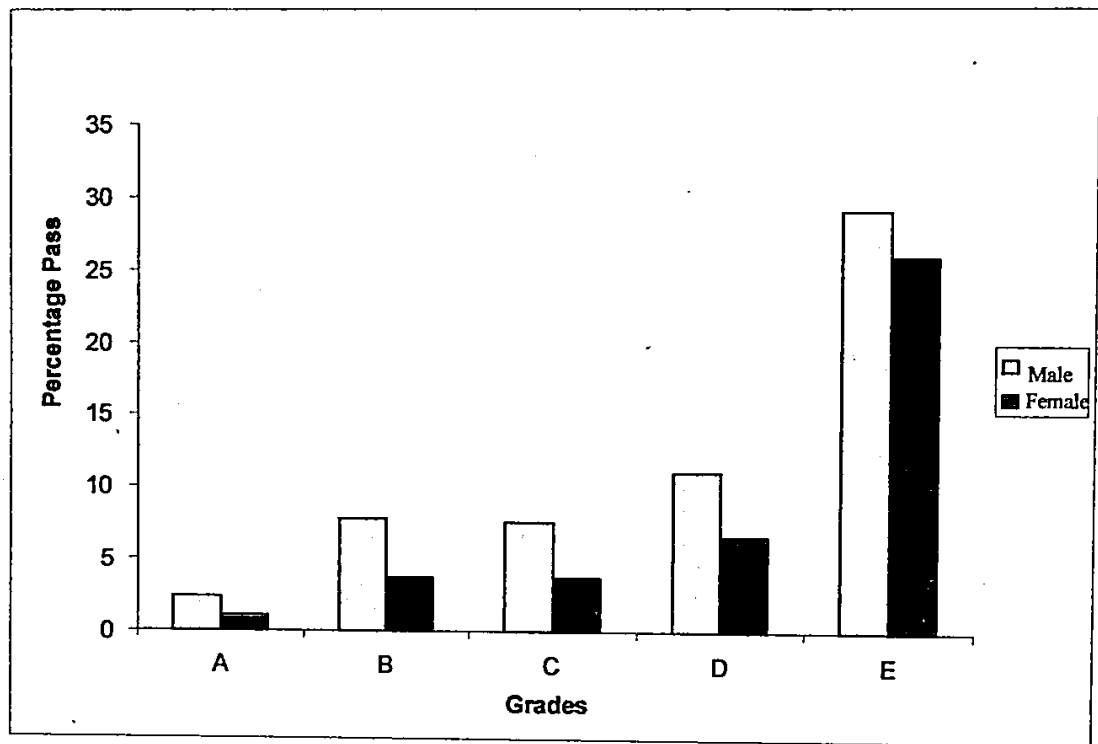


Figure 1: Performance of males and females in Core Mathematics (2001)

Figure 1 shows that higher percentage of both males and females failed in Core Mathematics. More males performed better than females in the various grades in Core Mathematics. It is observed that few of the females obtained grade A and grade B as compared to their male counterparts. Here, more females

performed poorly in Core Mathematics than the males and also many of the males obtained good passes.

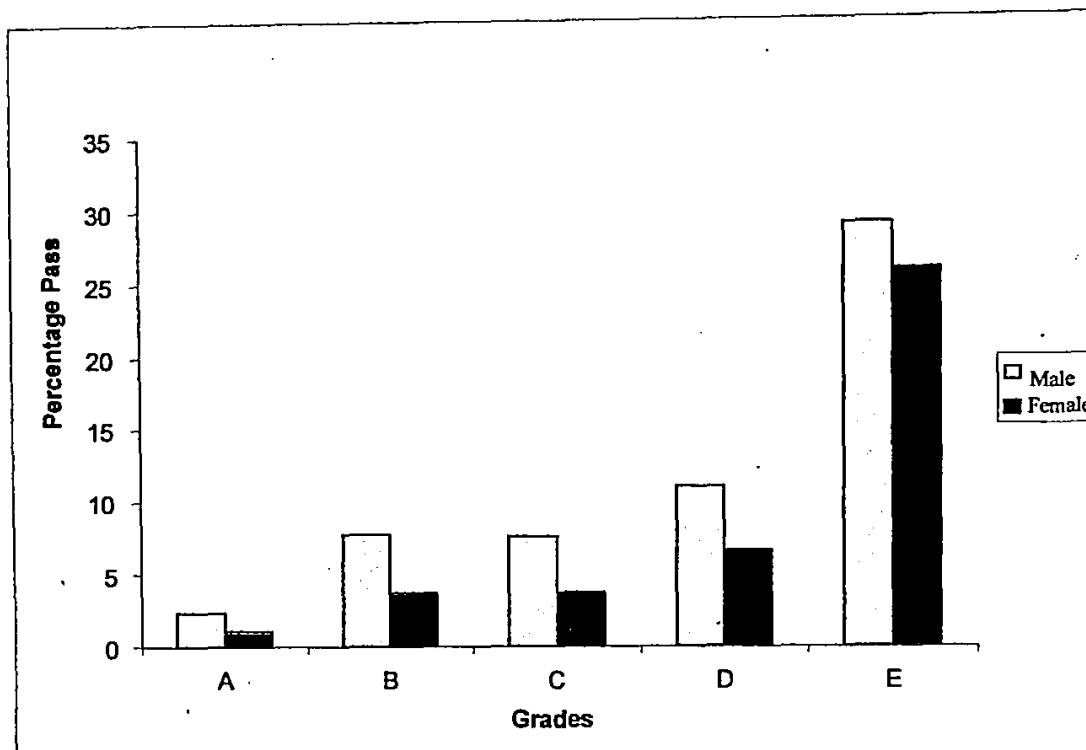


Figure 2: Performance of males and females in Integrated Science (2001)

From Figure 2, it shows that a higher percentage of males and females failed in Integrated Science. However, a lower percentage of males and females also performed excellently. It can be observed that the percentage passes of males and females kept on increasing from grade A to grade E. The percentage passes of males are higher than that of the females in each grade. The chart further reveals that the percentage of females who obtained grade B and grade C were almost the same. The figure reveals that many males and females performed poorly in Integrated Science and that many males also performed better than the females.

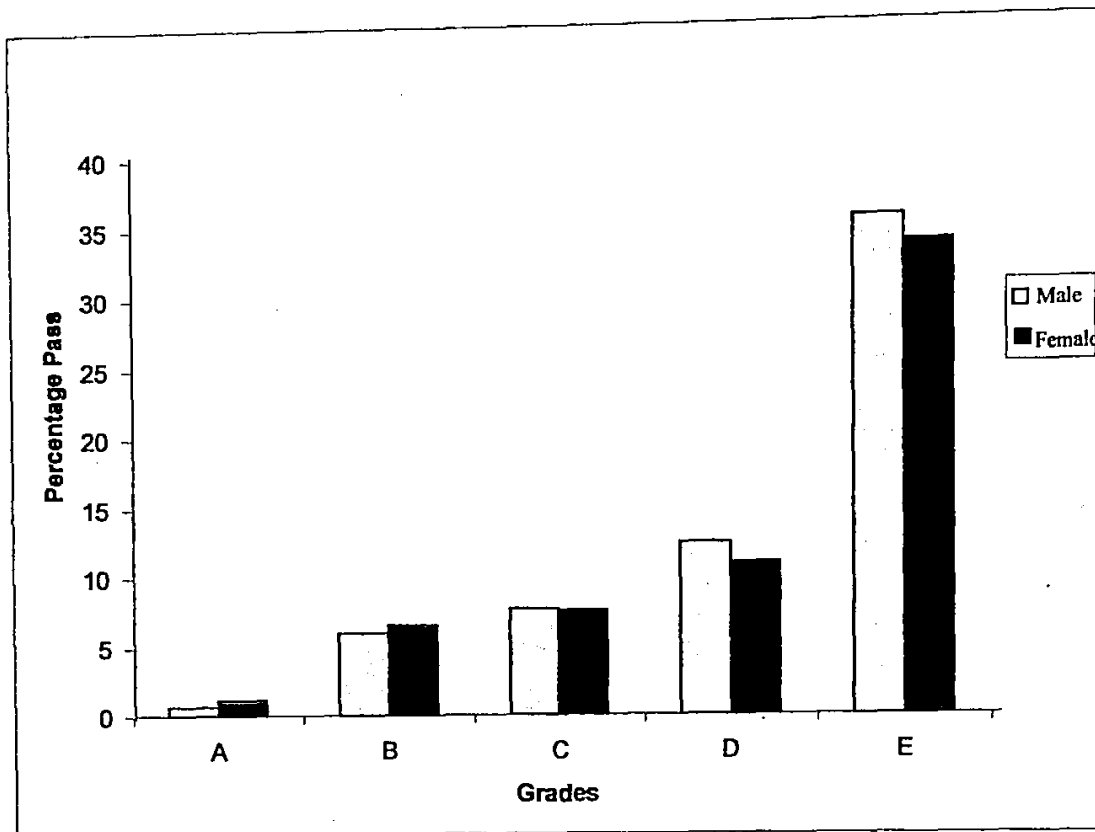


Figure 3: Performance of males and females in English Language (2001)

From Figure 3, in English language the percentage passes of both males and females were almost the same for the various grade levels. However, a higher percentage of the males obtained grade E as compared to that of the females. This shows that many males performed poorly in English Language than the females.

The chart also reveals that many females performed excellently than the males. A higher percentage of females obtained grade B than the percentage of males who obtained the same grade. However, a lower percentage of both males and females obtained grade A. The percentage of males who obtained grade C was the same as that of the females in English Language.

Here also the percentage of males and females who passed at the various grade levels increased from grade A to grade E.

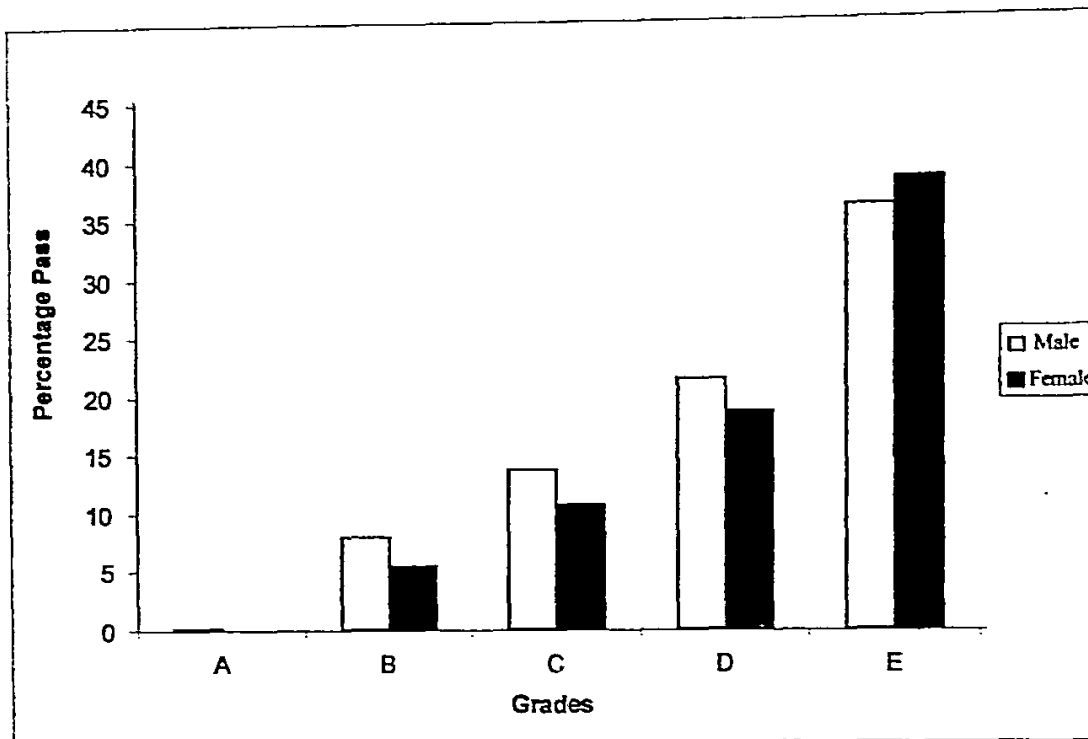


Figure 4: Performance of males and females in Social Studies (2001)

In Figure 4, we observed that a higher percentage of males and females obtained grade E. However, the percentage pass of males who obtained grade E was lower than that of the females. This indicates that a higher percentage of the females failed in Social Studies than the males. From the chart almost none of the males and females obtained grade A. The figure also shows that there are higher percentage passes of males than females in grade B, grade C and grade D. This shows that more males performed better in Social Studies than females.

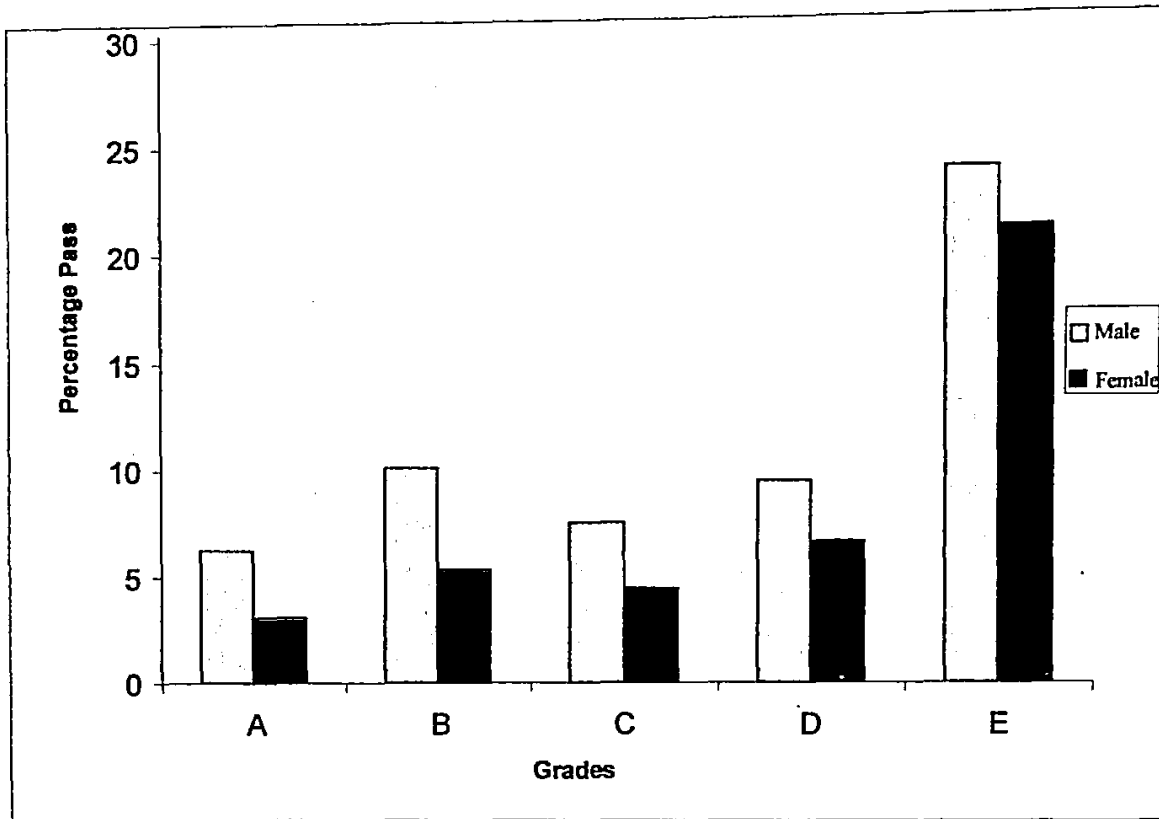


Figure 5: Performance of males and females in Core Mathematics (2002)

In Figure 5, a higher percentage of both males and females obtained grade E in Core Mathematics. A higher percentage of males obtained grade B whereas a higher percentage of females obtained credit. The chart also shows that a higher percentage of males obtained good passes (grade A to grade D) than females. However a lower percentage of both females and males performed excellently. The chart also shows that more males and females obtained grade B than those who obtained grade C. Here also, most of the males and females failed in Core Mathematics and also many males performed better than females.

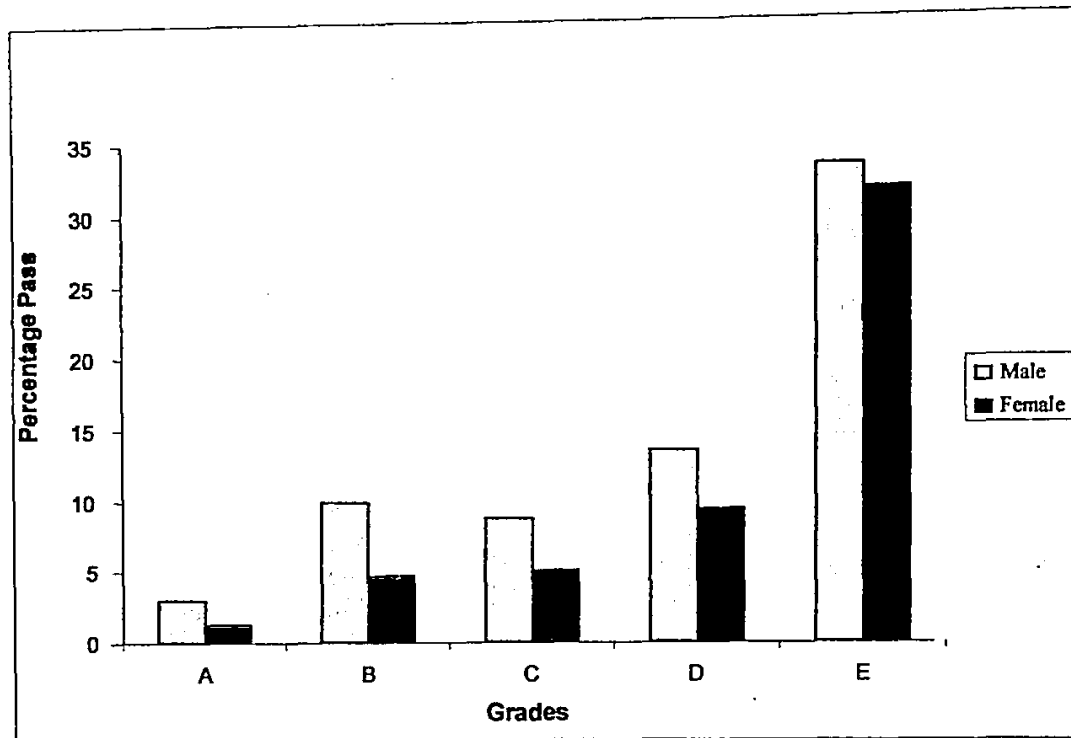


Figure 6: Performance of males and females in Integrated Science (2002)

Figure 6 reveals that a higher percentage of both males and females obtained grade E in Integrated Science. However, the percentage pass of males in grade E is higher than that of the females. This indicates that many males performed poorly than females in Integrated Science. The figure further shows that more males passed in the various grade levels than females. A lower percentage of both males and females also obtained grade A in Integrated Science. This shows that very few males and females performed excellently in this subject. The percentage of males who obtained grade C is however less than those who obtained grade B, but in the case of females, a higher percentage of them obtained grade C than those who obtained grade B.

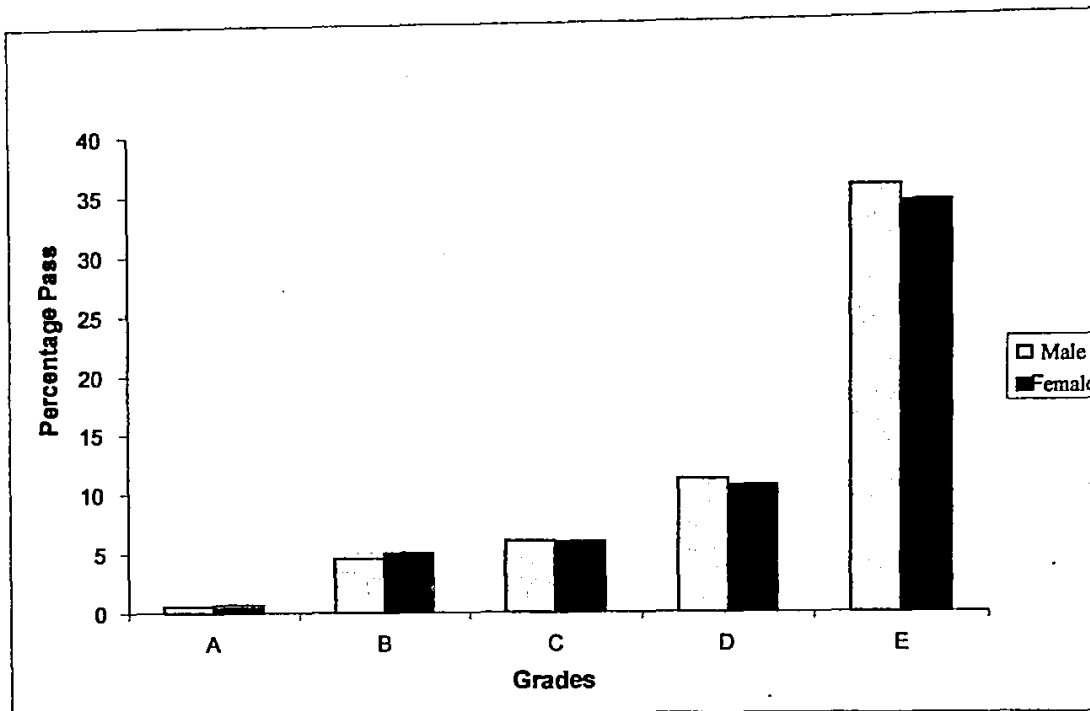


Figure 7: Performance of males and females in English Language (2002)

In Figure 7, we observe that the performance levels of both males and females in the various grades were the same. However, the percentage passes of both males and females increased across the various grade levels. The chart further shows that a lower percentage of both males and females obtained grade A. A higher percentage of both males and females obtained grade E with the percentage pass of the males exceeding that of the females. This shows that performance of candidates in English Language was poor.

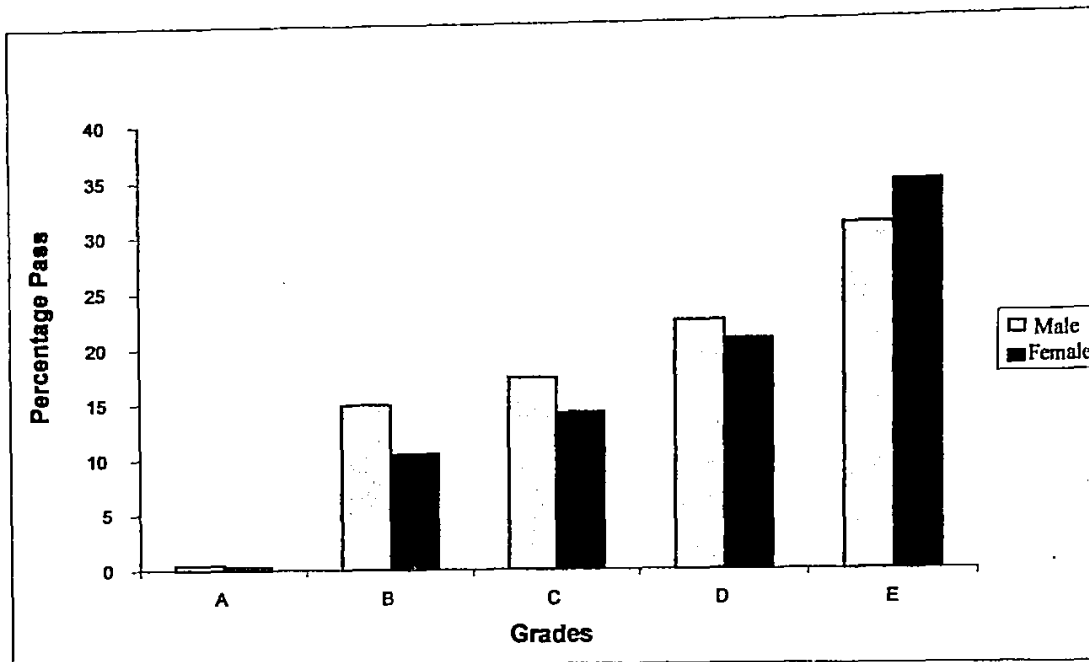


Figure 8: Performance of males and females in Social Studies (2002)

Figure 8 reveals that a higher percentage of both males and females obtained grade E with many females than males in this grade. The percentages of males in grade A, grade B, grade C and grade D were all higher than that of the females. However, a lower percentage of both males and females obtained the excellent grade. The chart shows that many males and females passed in Social Studies with a higher percentage of them obtaining grade B to grade D. It was also revealed that a higher percentage of females failed in Social Studies than males.

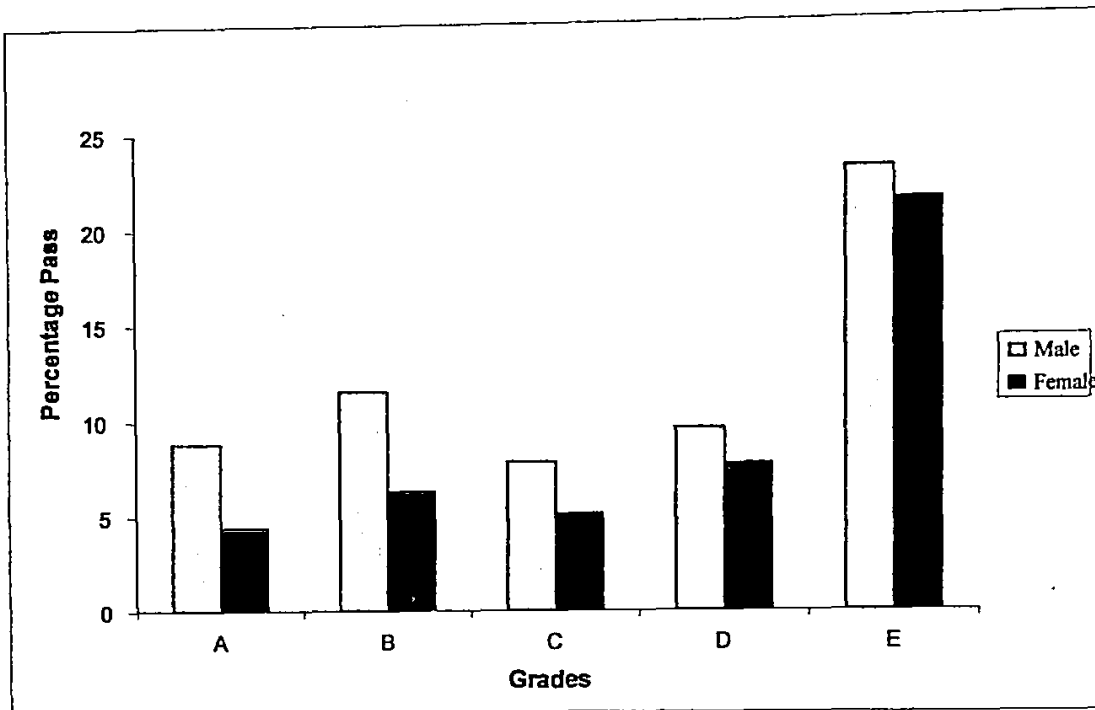


Figure 9: Performance of males and females in Core Mathematics (2003)

From Figure 9, we can observe that a higher percentage of both males and females obtained passes in Core Mathematics. It was also revealed that a high percentage of both males and females obtained grade A to grade D. However, the percentage passes of the males in the various grades were all higher than those of the females. This shows that many males performed better in Core Mathematics than females.

Figure 9 further reveals that a high percentage of both males and females performed excellently. The percentage of males and females who obtained grade C was lower than those who obtained grade B and grade D. Here also, the percentage of females who obtained grade D was higher than those who obtained grade A.

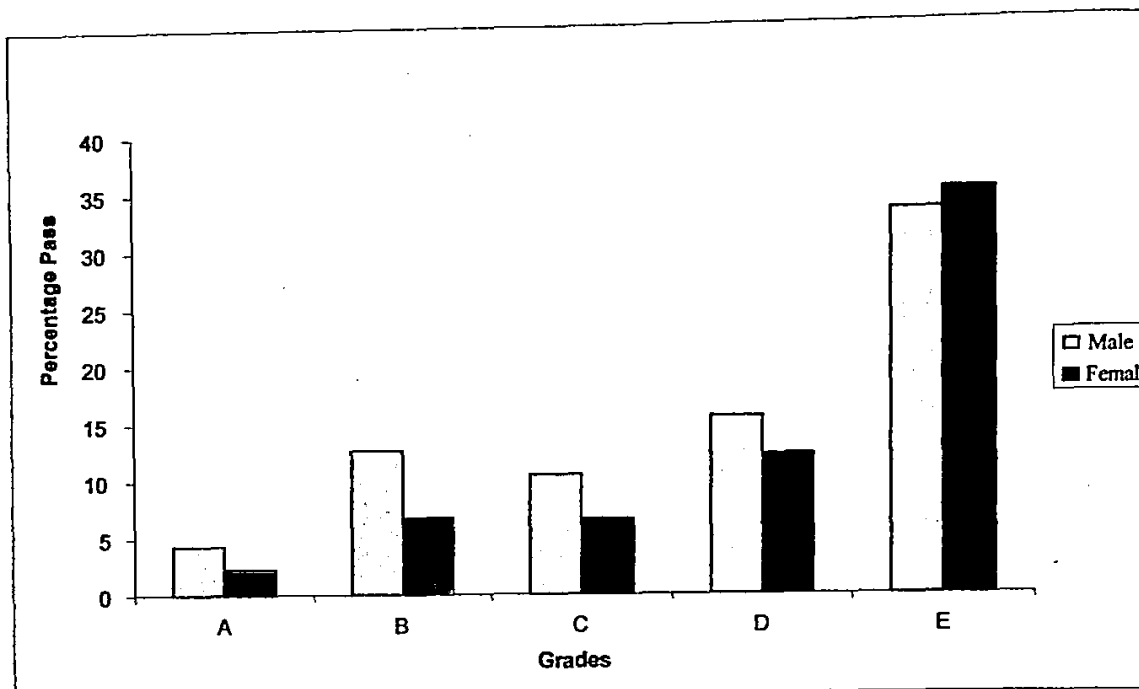


Figure 10: Performance of males and females in Integrated Science (2003)

In Figure 10 a higher percentage of both males and females obtained grade E in Integrated Science. However, the percentage of males was lower than that of the females in this grade. This shows that many of the females performed poorly in Integrated Science than the males. From the chart, the percentage passes of males in grade A to grade D were higher than those of females. This also shows that many males performed better than the females in the various grades.

It is observed that, very few males and females performed excellently in Integrated Science. Many males obtained grade B than those who obtained grade C but in the case of females, the percentage who obtained grade B and grade C was the same. This chart also shows that most of the males and females who passed in Integrated Science obtained grade D.

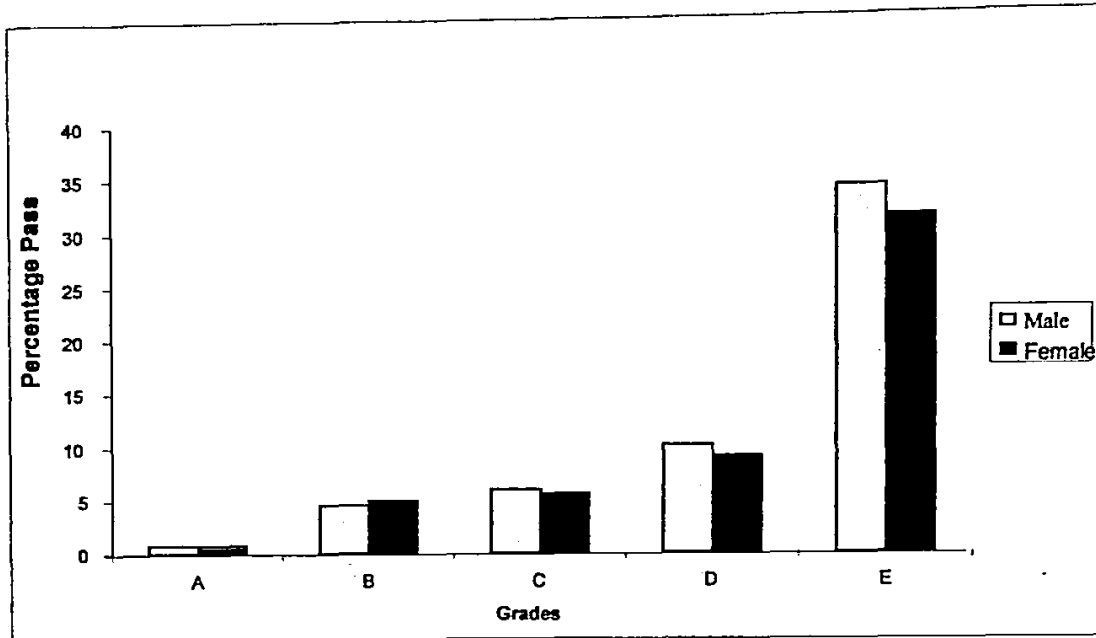


Figure 11: Performance of males and females in English Language (2003)

Figure 11 show that a higher percentage of both males and females obtained the pass grade in English Language. Also, many of the males obtained grade E as compared to the females. We observe that performances of males and females in English Language were almost the same for the various grades. However a lower percentage of males and females obtained the excellent grade.

This shows that both males and females performed poorly in English Language. There were also increases in percentage passes for both males and females from grade A to grade E. From Figure 11, the percentage pass of females in grade B was higher than that of the males. This shows that many of the females obtained very good grade than the males.

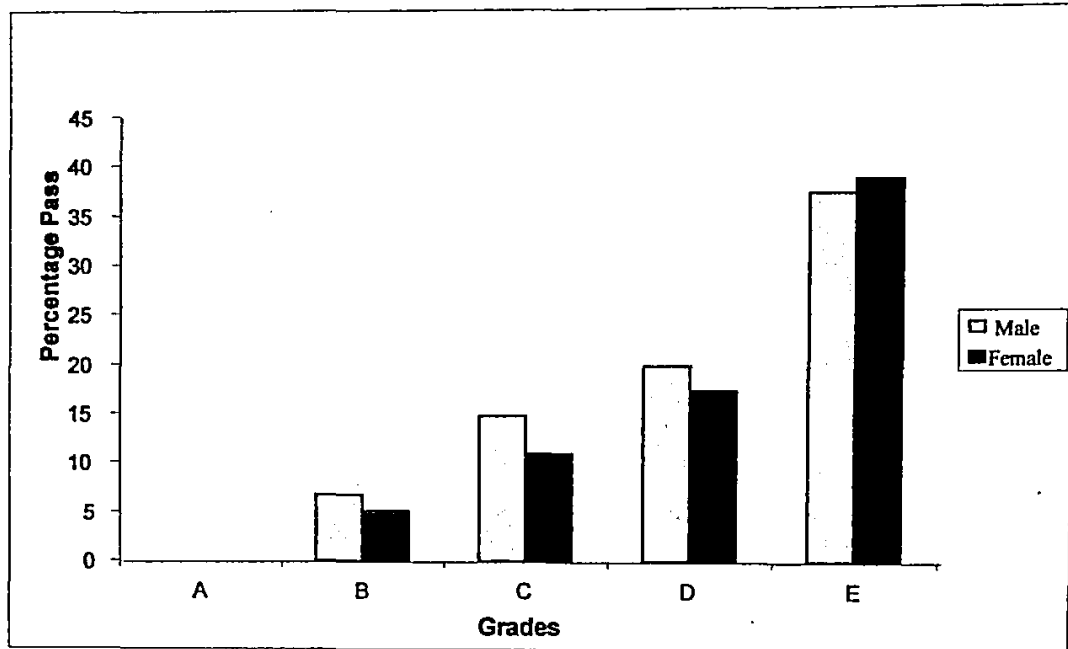


Figure 12: Performance of males and females in Social Studies (2003)

In Figure 12, it was observed that a higher percentage of both males and females obtained grade E in Social Studies. This shows that most males and females performed poorly in Social Studies and also none of them obtained the excellent grade. The percentage passes of males and females increased from grade B to grade E with the percentage of males exceeding that of the females in each grade except in grade E. This shows that many males passed in Social Studies than females.

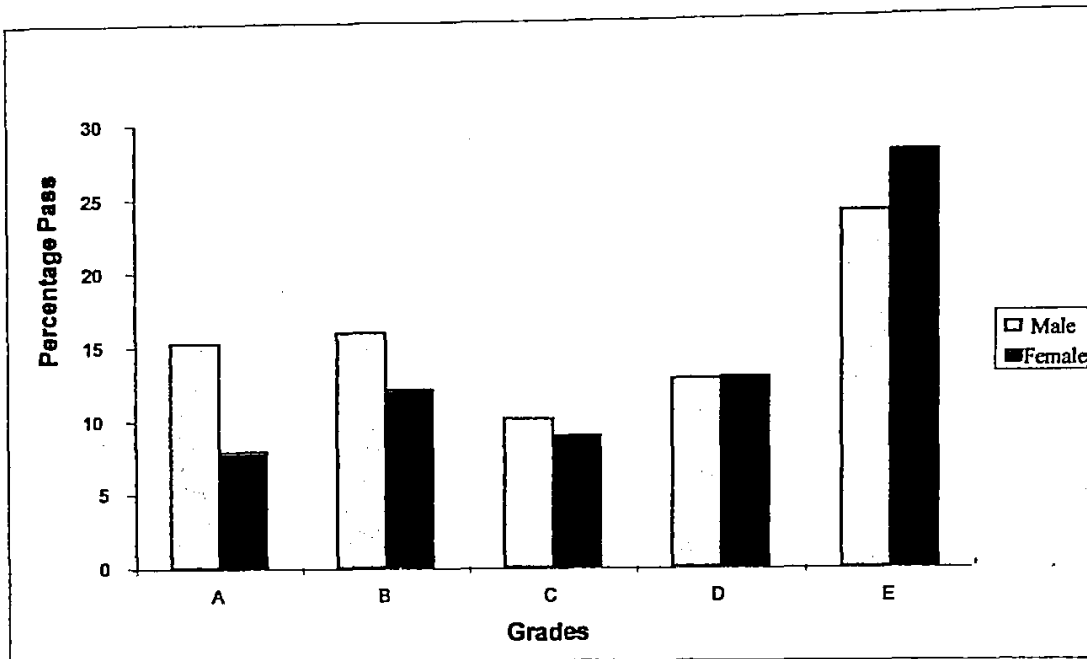


Figure 13: Performance of males and females in Core Mathematics (2004)

Figure 13 shows that a higher percentage of males and females obtained the pass grade in Core Mathematics. This shows that many of the males and females performed poorly in this subject. From the chart, the percentage of males who obtained grade A and grade B was higher than that of the females. This shows that, many males obtained good grades in Core Mathematics than females. However, the percentage of males and females who obtained grade C was lower than those in the other grades.

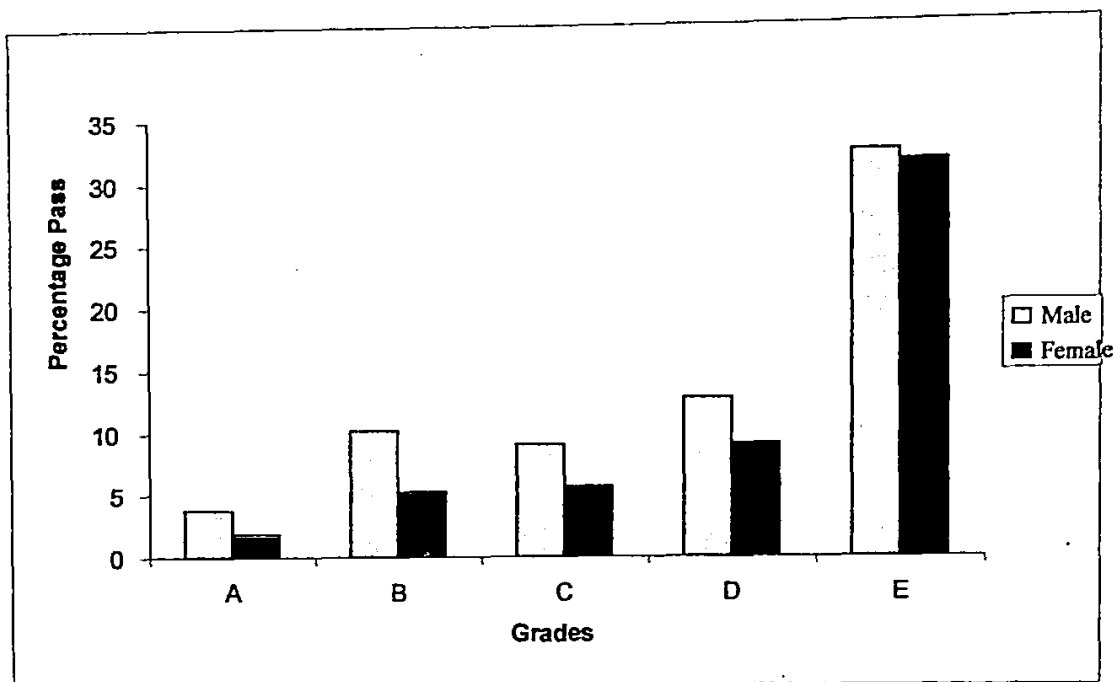


Figure 14: Performance of males and females in Integrated Science (2004)

In Figure 14, a lower percentage of males and females obtained grade A with that of the males exceeding that of the females in Integrated Science. The percentage passes of males were higher than those of the females in the various grades. This shows that, many males performed well than females in this subject. However, a higher percentage of males and females also obtained grade E, indicating that most of them also performed poorly in Integrated Science.

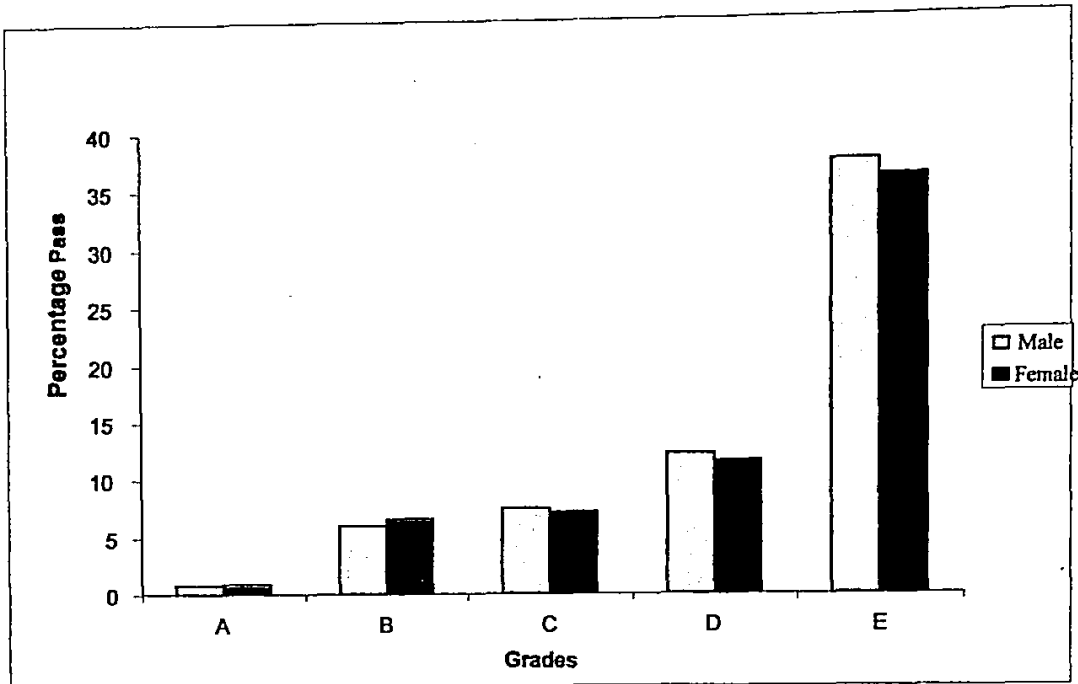


Figure 15: Performance of males and females in English Language (2004)

Figure 15 show that performances of males and females in English Language were almost the same in the various grades. Here also, the percentage of females who obtained grade B was slightly more than that of the males. This indicates that many of the females obtained good grades than males in English Language in 2004. However, a higher percentage of both males and females obtained grade E, indicating that most of them failed in English Language.

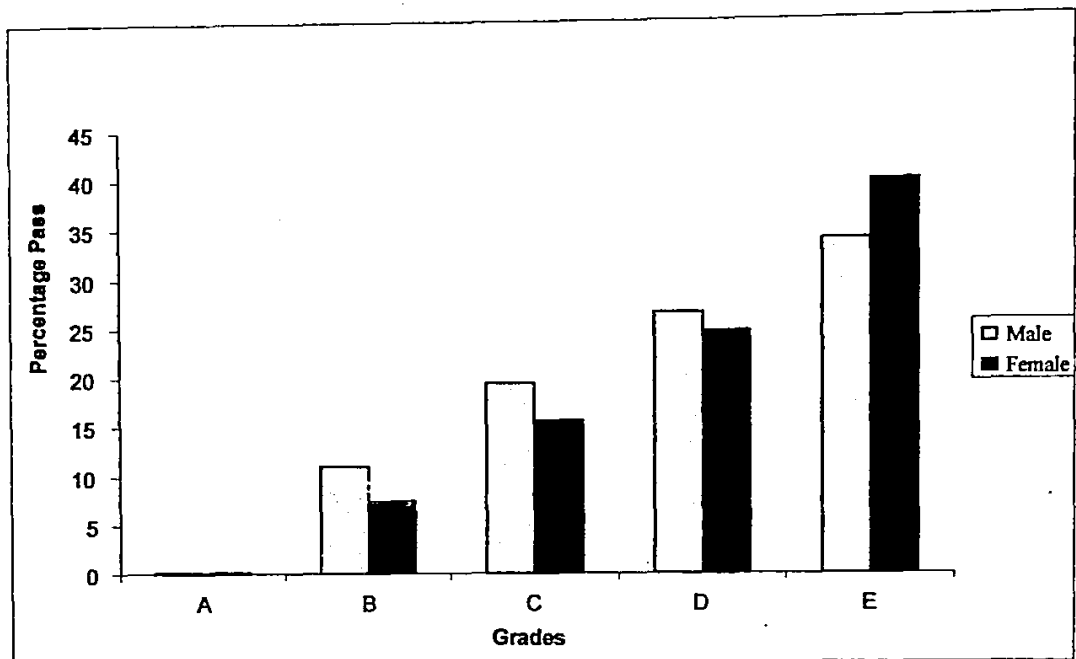


Figure 16: Performance of males and females in Social Studies (2004)

It was also observed that in Figure 16, a higher percentage of both males and females obtained grade E in Social Studies with that of the females exceeding the males. This shows that many of them performed poorly in Social Studies. Almost none of the males and females obtained the excellent grade, however, a high percentage of them obtained grade B, grade C and grade D. This shows that candidates' performance in Social Studies was good.

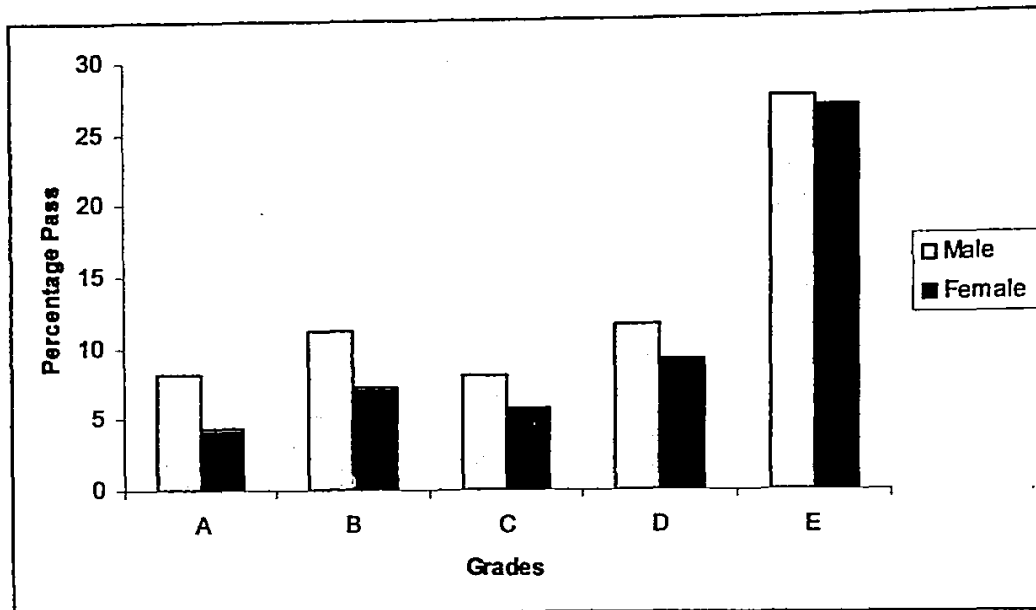


Figure 17: Performance of males and females in Core Mathematics (2005)

In this chart, a higher percentage of both males and females obtained grade E, indicating that most of them performed poorly in Core Mathematics. However, a higher percentage of males obtained grade A as compared to that of the females. The percentage passes of the males in the various grades except grade E were all higher than those of the females. This shows that many of the males performed well in Core Mathematics than the females.

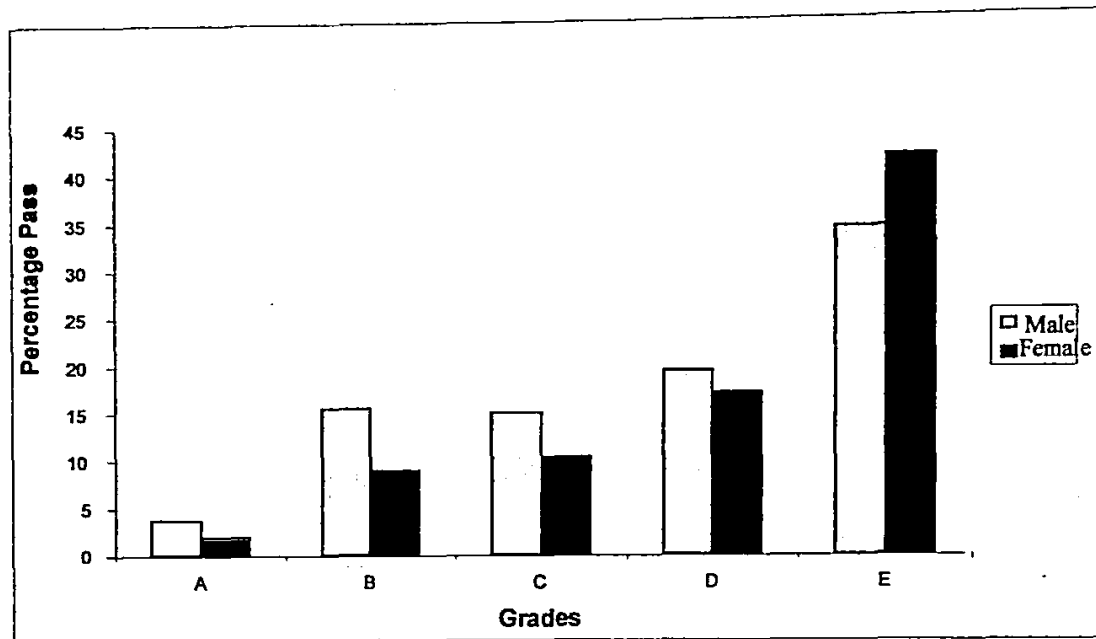


Figure 18: Performance of males and females in Integrated Science (2005)

Here Figure 18 reveals that many of the males and females obtained grade E, with the number of females exceeding that of males. This indicates that many females performed poorly in Integrated Science than males. A high percentage of males and females obtained grade B to grade D and a low percentage of them also obtained the excellent grade. This shows that performance of males and females in Integrated Science was good and many males had good passes than females.

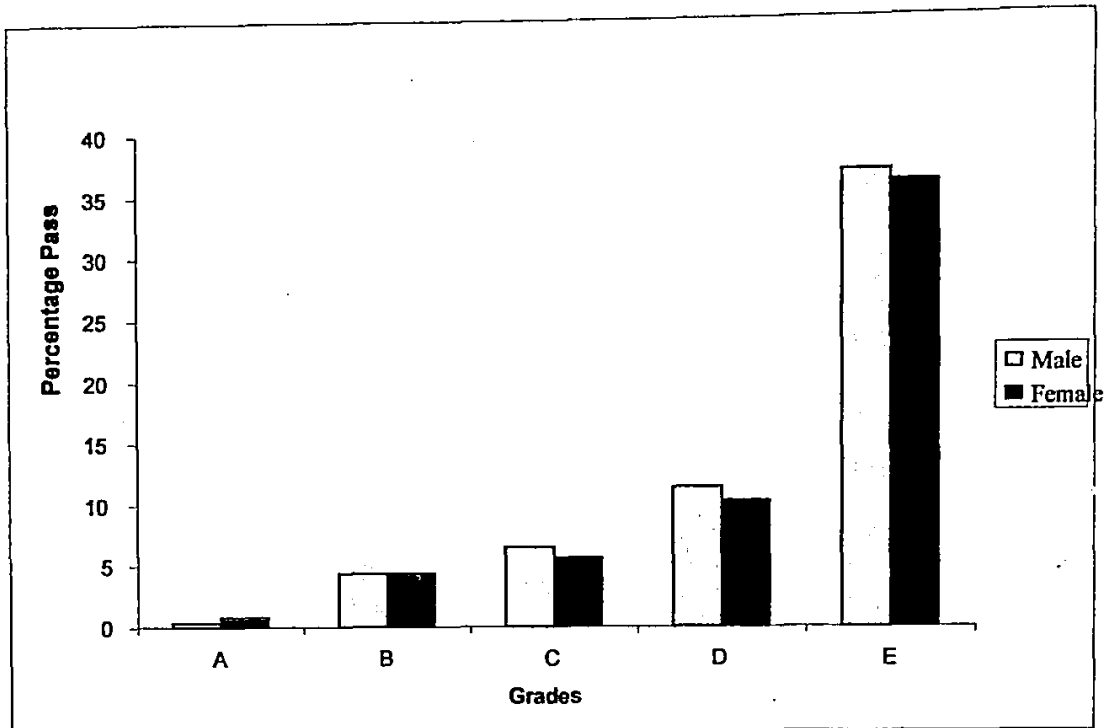


Figure 19: Performance of males and females in English Language (2005)

Figure 19 show that a lower percentage of both males and females obtained the excellent grade. However, most of them obtained grade E, indicating that performance of males and females in English Language was poor. From the chart, percentage passes of both males and females in the various grades were almost the same. This shows that the performance level of both males and females was almost the same in English Language.

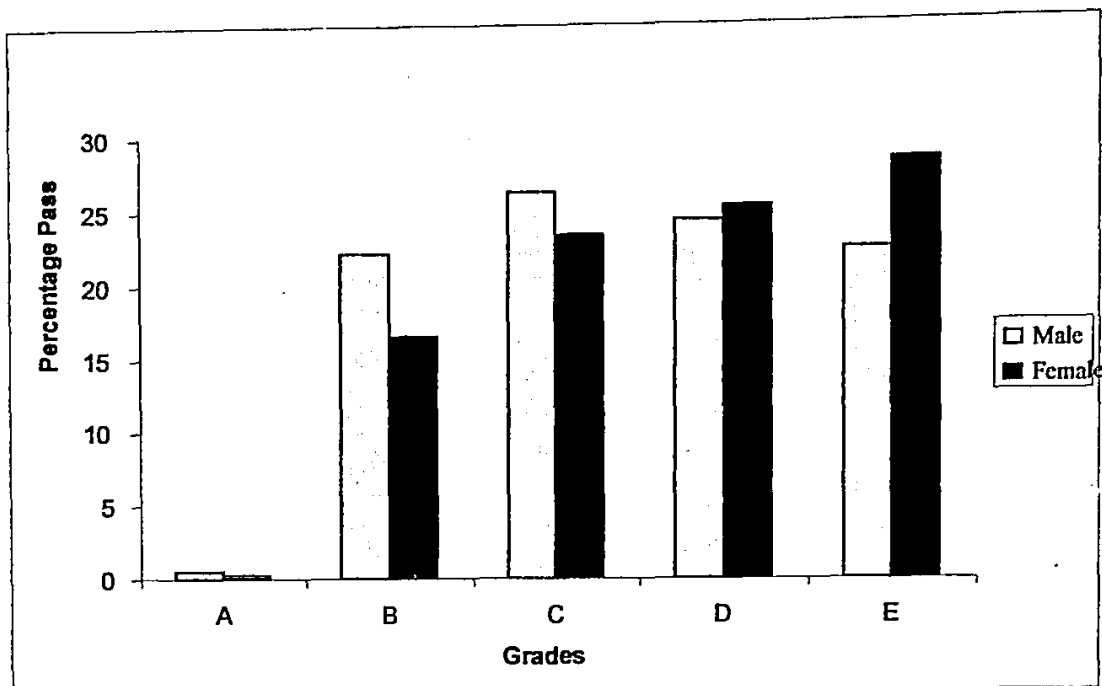


Figure 20: Performance of males and females in Social Studies (2005).

Figure 20 shows that a higher percentage of both males and females obtained grade E, with percentage of females exceeding the males. The percentage pass of females who obtained grade D in Social Studies was also higher than that of the males. This shows that many females performed poorly in Social Studies than males. However, a high percentage of both males and females obtained grade B to grade D but a very low percentage of them performed excellently. This shows that many of the males and females performed well in Social Studies.

CHAPTER FOUR

FURTHER ANALYSIS

Chi-square test for Independence

In Chapter Three, it was observed that the performances of males and females were different in all the four core subjects considered. In this chapter, we shall test for the significance of these differences. These tests will help us to establish concrete statistical evidence of whether performance is dependent on sex or not. The appropriate test to use here is the chi-square test for independence.

We examine the results of the core subjects, which are Core Mathematics, Integrated Science, English Language and Social Studies of the Senior Secondary School Certificate Examination. The performances of males and females in the Senior Secondary School Certificate Examinations were classified into the three categories described below.

Table 7: Classification of grades obtained by candidates

| Performance | Grades |
|--------------------|---------------|
| Above average | A and B |
| Average | C and D |
| Below average | E |

The χ^2 equation in Section 2.2 is used to calculate the χ^2 values in Tables 8 - 27 when the calculated χ^2 value is greater than the critical value that is, the chi-square value with 2 degrees of freedom at the 0.05 level of significance (i.e. 5.991), the null hypothesis, H_0 is rejected.

HYPOTHESIS

H_0 : Performance in Core Mathematics and Sex are independent.

H_1 : Performance in Core Mathematics and Sex are not independent.

Table 8: Performance in Core Mathematics by sex (2001)

| Performance | Sex | |
|---------------|------|--------|
| | Male | Female |
| Above average | 7386 | 2776 |
| Average | 5809 | 3049 |
| Below average | 7754 | 5515 |

In the computer printout shown in Appendix B (I) for the year 2001, the chi-square test statistic based on the data in Table 8 is $\chi^2 = 515.775$. From statistical tables, the χ^2 with 2 degrees of freedom at 0.05 level of significance is 5.991. Thus, the calculated χ^2 value of 515.715 is greater than the critical value of 5.991. Hence, we reject H_0 and conclude that performance in Core Mathematics is dependent on sex.

Table 9: Performance in Core Mathematics by sex (2002)

| Performance | Sex | |
|---------------|------|--------|
| | Male | Female |
| Above average | 6518 | 2588 |
| Average | 6753 | 3396 |
| Below average | 9594 | 6502 |

From the computer print out in Appendix B (II), the chi-square test statistic based on Table 9 is 386.822. Again, this calculated chi-square value (386.822) is greater than the critical value (5.991), so the null hypothesis is rejected. We, therefore conclude that performance in Core Mathematics is dependent on sex.

Table 10: Performance in Core Mathematics by sex (2003)

| Performance | Sex | |
|---------------|-------|--------|
| | Male | Female |
| Above average | 9170 | 3755 |
| Average | 7835 | 4486 |
| Below average | 10400 | 7516 |

From Appendix B (III), the chi-square test statistic based on Table 10 is 539.555, which is greater than the critical value of 5.991. The null hypothesis is,

therefore, rejected. We conclude that performance in Core Mathematics is dependent on sex.

Table 11: Performance in Core Mathematics by sex (2004)

| Performance | Sex | |
|---------------|-------|--------|
| | Male | Female |
| Above average | 16844 | 8353 |
| Average | 12309 | 9100 |
| Below average | 12893 | 11621 |

The chi-square test statistic based on Table 11 is found to be 1079.213 in Appendix B (IV). This value is greater than the critical value, $\chi^2_{0.05}(2) = 5.991$. Thus, we reject the null hypothesis, H_0 , and conclude that performance in Core Mathematics is dependent on sex.

Table 12: Performance in Core Mathematics by sex (2005)

| Performance | Sex | |
|---------------|-------|--------|
| | Male | Female |
| Above average | 12295 | 5588 |
| Average | 12397 | 7226 |
| Below average | 17359 | 12960 |

Based on the data in Table 12, Appendix B (V), the chi-square test statistic

is 647.700. This is greater than $\chi^2_{0.05}(2) = 5.991$, so we reject H_0 and conclude that performance in Core Mathematics is dependent on sex.

Statistically, we have sufficient evidence based on available data to conclude that performance in Core Mathematics in the SSSCE for the period 2001 - 2005 is dependent on the sex of the candidate. Male students performed better than their female counterparts.

Similar tests are performed on results for Integrated Science for the same period to verify the hypothesis below.

HYPOTHESIS

H_0 : Performance in Integrated Science and Sex are independent.

H_1 : Performance in Integrated Science and Sex are not independent.

Table 13: Performance in Integrated Science by sex (2001)

| Performance | Sex | |
|---------------|-------|--------|
| | Male | Female |
| Above average | 3822 | 1398 |
| Average | 7016 | 2947 |
| Below average | 10939 | 7370 |

The chi-square test statistic based on the data in Table 13, Appendix B (VI), is 505.951 for the year 2001. Since the test statistic, 505.951 is greater than the critical value, $\chi^2_{0.05}(2) = 5.991$, we reject H_0 and conclude that performance

in Integrated Science depends on sex.

Table 14: Performance in Integrated Science by sex (2002)

| Performance | Sex | |
|---------------|-------|--------|
| | Male | Female |
| Above average | 5150 | 1819 |
| Average | 8889 | 4415 |
| Below average | 13357 | 9747 |

The χ^2 value based on Table 14 in Appendix B (VII) is 705.703 for the year 2002. This value is greater than $\chi^2_{0.05}(2) = 5.991$, hence we reject H_0 and conclude that performance in Integrated Science for the year 2002 is dependent on sex.

Table 15: Performance in Integrated Science by sex (2003)

| Performance | Sex | |
|---------------|-------|--------|
| | Male | Female |
| Above average | 7646 | 3178 |
| Average | 11738 | 6601 |
| Below average | 15026 | 12333 |

The calculated chi-square value is 915.952 for the year 2003 results. This value is greater than $\chi^2_{0.05}(2) = 5.991$. Thus, we reject H_0 and conclude that

performance in Integrated Science depends on sex.

Table 16: Performance in Integrated Science by sex (2004)

| Performance | Sex | |
|---------------|-------|--------|
| | Male | Female |
| Above average | 7521 | 2986 |
| Average | 11785 | 6153 |
| Below average | 17446 | 13196 |

From Appendix B (IX), $\chi^2 = 847.949$ based on the data in Table 16. This value is greater than the critical value, 5.991, and so we reject the null hypothesis, H_0 . Hence we conclude based on the results in Table 16 that, performance in Integrated Science for the year 2004 depends on sex.

Table 17: Performance in Integrated Science by sex (2005)

| Performance | Sex | |
|---------------|-------|--------|
| | Male | Female |
| Above average | 12153 | 5274 |
| Average | 21660 | 13284 |
| Below average | 21727 | 20241 |

Appendix B (X) shows that the test statistic based on results shown in Table 17 is 1863.660. Here, $1863.660 > 5.991$ (critical value), so we reject H_0 and

conclude that performance in Integrated Science for the year 2005 depended on sex.

Statistically, we have sufficient evidence based on available data to conclude that performance in Integrated Science in the SSSCE for the period 2001 - 2005 is dependent on the sex of the candidate. Male students performed better than their female counterparts.

A similar test is performed on performance in English Language.

HYPOTHESIS

H_0 : Performance in English Language and Sex are independent.

H_1 : Performance in English Language and Sex are not independent.

Table 18: Performance in English Language by sex (2001)

| Performance | Sex | |
|---------------|-------|--------|
| | Male | Female |
| Above average | 2497 | 2196 |
| Average | 7548 | 5268 |
| Below average | 13460 | 9630 |

Here also, the test statistic from Appendix B (XI), based on the results in Table 18 for the year 2001 is 49.265. This value, $\chi^2 = 49.265$, is greater than the critical value $\chi^2_{0.05}(2) = 5.991$ and so we reject H_0 and conclude that performance in English Language depends on sex.

Table 19: Performance in English Language by sex (2002)

| Performance | Sex | |
|---------------|-------|--------|
| | Male | Female |
| Above average | 2045 | 1771 |
| Average | 6884 | 5126 |
| Below average | 14288 | 10534 |

From Appendix B (XII), the chi-square test statistic based on the results in Table 19, is 22.070. The critical value, $\chi^2_{0.05}(2)$, is 5.991. This shows that χ^2 value for Table 19 is greater than $\chi^2_{0.05}(2)$ and so H_0 is rejected. Hence we conclude that performance in English Language for the year 2002 depends on sex.

Table 20: Performance in English Language by sex (2003)

| Performance | Sex | |
|---------------|-------|--------|
| | Male | Female |
| Above average | 2393 | 2017 |
| Average | 7277 | 5125 |
| Below average | 15455 | 11053 |

As in the results for 2002, χ^2 value for Table 20 is 29.023. Since $29.023 > 5.991$ (critical value), we reject H_0 and conclude that performance in English Language for the year 2003 is dependent on sex.

Table 21: Performance in English Language by sex (2004)

| Performance | Sex | |
|---------------|-------|--------|
| | Male | Female |
| Above average | 3616 | 3118 |
| Average | 10624 | 7810 |
| Below average | 20250 | 15134 |

From Appendix A, the chi-square value for Table 21, which is performance in English Language by sex for the year 2004 is 33.936. Since $33.936 > 5.991$, the null hypothesis is rejected. We, therefore conclude that performance in English Language is dependent on sex for the year 2004.

Table 22: Performance in English Language by sex (2005)

| Performance | Sex | |
|---------------|-------|--------|
| | Male | Female |
| Above average | 2967 | 2490 |
| Average | 11259 | 7688 |
| Below average | 23355 | 17514 |

In the case of English Language for 2005, the chi-square test statistic based on the results in Table 22 is 53.264. Since 53.264 is greater than 5.991, we reject H_0 and conclude that performance in English Language for the year 2005 depended on sex.

We further perform the same test on performance in Social Studies.

HYPOTHESIS

H_0 : Performance in Social Studies and Sex are independent.

H_1 : Performance in Social Studies and Sex are not independent.

Table 23: Performance in Social Studies by sex (2001)

| Performance | Sex | |
|---------------|-------|--------|
| | Male | Female |
| Above average | 3031 | 1564 |
| Average | 13194 | 8343 |
| Below average | 13579 | 10929 |

As indicated in Appendix B (XVI), the chi-square test statistic for the data in Table 23 is 268.255. This value is greater than 5.991 (the critical value), so we reject the null hypothesis, H_0 and conclude that performance in Social Studies for the year 2001 depended on sex.

Table 24: Performance in Social Studies by sex (2002)

| Performance | Sex | |
|---------------|-------|--------|
| | Male | Female |
| Above average | 6166 | 3327 |
| Average | 15871 | 10708 |
| Below average | 12373 | 10637 |

From Appendix B (XVII), the χ^2 value for the data in Table 24 is 388.814. This value is greater than 5.991, so we reject H_0 and conclude that performance in Social Studies is dependent on sex.

Table 25: Performance in Social Studies by sex (2003)

| Performance | Sex | |
|---------------|-------|--------|
| | Male | Female |
| Above average | 3051 | 1791 |
| Average | 15614 | 9899 |
| Below average | 16815 | 13588 |

For the data in Table 25, the chi-square value is calculated to be 245.104 in Appendix B (XVIII). Since this value is greater than the critical value, $\chi^2_{0.05}(2) = 5.991$, we reject H_0 and conclude that for the year 2003, performance in social studies depended on sex.

Table 26: Performance in Social Studies by sex (2004)

| Performance | Sex | |
|---------------|-------|--------|
| | Male | Female |
| Above average | 5971 | 3119 |
| Average | 24740 | 16779 |
| Below average | 18275 | 16595 |

Appendix B (XIX) shows that the χ^2 value for the data in Table 26 is 691.708. The critical value is $\chi^2_{0.05}(2) = 5.991$ and since this is less than the calculated χ^2 value which is 691.708, we reject H_0 and conclude that for the year 2004 performance in Social Studies depended on sex.

Table 27: Performance in Social Studies by sex (2005)

| Performance | Sex | |
|---------------|-------|--------|
| | Male | Female |
| Above average | 14333 | 8145 |
| Average | 32002 | 23638 |
| Below average | 14137 | 13758 |

From Appendix B (XX), the χ^2 value for the data in Table 27 is 882.263. Since this value is greater than $\chi^2_{0.05}(2) = 5.991$, we reject H_0 and conclude that performance in Social Studies for the year 2005 is dependent on sex.

Statistically, we have sufficient evidence based on available data to conclude that performance in Social Studies in the SSSCE for the period 2001 - 2005 is dependent on the sex of the candidate. Male students performed better than their female counterparts.

The next chapter will therefore discuss all the analysis made and deduce fitting conclusions.

CHAPTER FIVE

DISCUSSION AND CONCLUSION

The study analyzed performance by sex in the four core subjects of the Senior Secondary School Certificate Examinations organized by the West African Examinations Council, namely, Core Mathematics, Integrated Science, English Language and Social Studies. The study covered a period of five years, from 2001 to 2005.

This study was motivated by the perception in Ghana that, generally, females lag behind males on the educational ladder. Since the core subjects are compulsory for all students, the study concentrated on the core subjects. The chi-square test of independence was used to test whether performances in the core subjects depended on the sex of the candidate. The results show that in all the four core subjects performance is sex-dependent.

DISCUSSION

The perception that performance in examinations on the academic ladder is dependent on the sex of individual motivated this study. Progression on the educational ladder from secondary education to tertiary education depends on passing the core subjects (Core Mathematics, Integrated Science, English

Language and Social Studies). However, this does not mean that the remaining subjects are not important. It was the desire of the researcher to cover all the subjects for the various programmes to see how males and females perform in the various subjects. Nevertheless, time and resource constraints did not permit the researcher to consider all the subjects. The logical extension to this work is to test for the differences in gender performances. However, this is beyond the scope of this research since it will require a new set of data. Meanwhile the preliminary analysis indicated that males appear to perform better than females in the SSSCE core subjects.

It is also the hope of the researcher that the results will serve as a wake-up call for all stakeholders to find ways of helping female students, in particular, to improve on their performances in the SSSCE. Parents need to encourage their wards, especially the females, to take their core subjects as well as elective subjects seriously. Teachers responsible for these subjects and other subjects in the various secondary schools need to encourage their students, especially, female students, to improve on their performance in these subjects.

Finally, it is the desire of the researcher that further research into sex performance in various sections of the educational sector will be encouraged. This is especially necessary, now that there appears to be a strong feeling nationwide for accelerated actions to facilitate girl-child education and gender equality.

CONCLUSION

It was revealed in Chapter Three that the number of males who passed in the various grade levels for Core Mathematics, Integrated Science, English Language and Social Studies, far exceeded that of the females. On the other hand, many females performed below average than the males in most of the core subjects. The percentage passes for the males in the various grades especially grades (A, B and C) for these core subjects were higher than those of the females.

Chapter Four also confirmed that performances in the core subjects: Core Mathematics, Integrated Science, English Language and Social Studies depended on sex. That is, from the analysis of the data, it seems that males perform better in the S.S.S.C.E core subjects than females. This indicates that males perform better than females in the academic ladder since passing of these core subjects which are compulsory for entry into the tertiary institutions will help one to move forward on the academic ladder.

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APPENDICES

Appendix A

Five Years Performance Statistics by Gender in the Various SSSCE Core Subjects in Ghana (2001 – 2005)

Core Mathematics

| YEAR | SEX | NO. SAT. | GRADES | | | | | | | |
|------|--------|-------------|--------|------|------|------|-------|-------|-------|-----|
| | | | A | B | C | D | E | F | A – E | ABS |
| 2001 | Male | 37740 | 3265 | 4121 | 2750 | 3059 | 7754 | 16638 | 20949 | 518 |
| | Female | 28553 | 1132 | 1644 | 1293 | 1756 | 5515 | 17177 | 11340 | 304 |
| 2002 | Male | 40167 | 2493 | 4025 | 2996 | 3757 | 9594 | 17156 | 22865 | 388 |
| | Female | 30836 | 957 | 1631 | 1368 | 2028 | 6502 | 18294 | 12486 | 232 |
| 2003 | Male | 45186 | 3964 | 5206 | 3519 | 4316 | 10400 | 17412 | 27405 | 410 |
| | Female | 35211 | 1542 | 2213 | 1791 | 2695 | 7516 | 19205 | 15757 | 260 |
| 2004 | Male | 54002 | 8230 | 8614 | 5437 | 6872 | 12893 | 11859 | 42046 | 503 |
| | Female | 41828 | 3299 | 5054 | 3724 | 5376 | 11621 | 12729 | 29074 | 333 |
| 2005 | Male | 63205 | 5183 | 7112 | 5088 | 7309 | 17359 | 20862 | 42051 | 443 |
| | Female | 48556 | 2097 | 3491 | 2814 | 4412 | 12960 | 22612 | 25774 | 371 |

Integrated Science

| YEAR | SEX | NO. SAT. | GRADES | | | | | | | |
|------|--------|-------------|--------|------|------|-------|--------|-------|-------|-----|
| | | | A | B | C | D | E | F | A-E | ABS |
| 2001 | Male | 37722 | 888 | 2934 | 2872 | 4144 | 10939 | 15809 | 21777 | 535 |
| | Female | 28542 | 323 | 1075 | 1073 | 1874 | 7370 | 16802 | 11715 | 315 |
| 2002 | Male | 40181 | 1194 | 3956 | 3489 | 5400 | 133357 | 12704 | 27396 | 374 |
| | Female | 30834 | 395 | 1424 | 1545 | 2870 | 9747 | 14835 | 15981 | 234 |
| 2003 | Male | 45145 | 1963 | 5683 | 4741 | 6997 | 15026 | 10528 | 34410 | 451 |
| | Female | 35180 | 816 | 2362 | 2304 | 4297 | 12333 | 13005 | 22112 | 291 |
| 2004 | Male | 53961 | 2060 | 5461 | 4899 | 6886 | 17446 | 16981 | 36752 | 544 |
| | Female | 41809 | 787 | 2199 | 2360 | 3793 | 13196 | 19407 | 22335 | 352 |
| 2005 | Male | 63180 | 2371 | 9782 | 9458 | 12202 | 21727 | 7566 | 55540 | 470 |
| | Female | 48534 | 953 | 4321 | 5030 | 8254 | 20241 | 9722 | 38799 | 393 |

English Language

| YEAR | SEX | NO. SAT. | GRADES | | | | | | | |
|------|--------|-------------|--------|------|------|------|-------|-------|-------|-----|
| | | | A | B | C | D | E | F | A-E | ABS |
| 2001 | Male | 37856 | 251 | 2246 | 2876 | 4672 | 13460 | 14181 | 23505 | 418 |
| | Female | 28588 | 332 | 1864 | 2144 | 3124 | 9630 | 11452 | 17094 | 275 |
| 2002 | Male | 40285 | 207 | 1838 | 2412 | 4472 | 14288 | 16984 | 23217 | 284 |
| | Female | 30881 | 209 | 1562 | 1811 | 3256 | 10534 | 13496 | 17372 | 192 |
| 2003 | Male | 45298 | 336 | 2057 | 2733 | 4544 | 15455 | 19871 | 25125 | 308 |
| | Female | 35246 | 263 | 1754 | 1936 | 3189 | 11053 | 16864 | 18195 | 230 |
| 2004 | Male | 54149 | 403 | 3213 | 4056 | 6568 | 20250 | 19573 | 34490 | 370 |
| | Female | 41916 | 398 | 2720 | 2998 | 4812 | 15134 | 15850 | 26062 | 252 |
| 2005 | Male | 63312 | 191 | 2776 | 4096 | 7163 | 23355 | 25549 | 37581 | 355 |
| | Female | 48620 | 357 | 2133 | 2748 | 4940 | 17514 | 20802 | 27692 | 313 |

Social Studies

| YEAR | SEX | NO. SAT. | GRADES | | | | | | | |
|------|--------|-------------|--------|-------|-------|-------|-------|------|-------|-----|
| | | | A | B | C | D | E | F | A-E | ABS |
| 2001 | Male | 37726 | 44 | 2987 | 5137 | 8057 | 13579 | 7778 | 29804 | 548 |
| | Female | 28547 | 17 | 1547 | 3047 | 5296 | 10929 | 7685 | 20836 | 316 |
| 2002 | Male | 40171 | 190 | 5976 | 6914 | 8957 | 12373 | 5688 | 34410 | 398 |
| | Female | 30808 | 112 | 3215 | 4353 | 6355 | 10637 | 6126 | 24672 | 265 |
| 2003 | Male | 45097 | 24 | 3027 | 6644 | 8970 | 16815 | 9416 | 35480 | 509 |
| | Female | 35127 | 20 | 1771 | 3829 | 6070 | 13588 | 9788 | 25278 | 349 |
| 2004 | Male | 53878 | 52 | 5919 | 10440 | 14306 | 18275 | 4772 | 48992 | 641 |
| | Female | 41781 | 45 | 3074 | 6507 | 10272 | 16595 | 5277 | 36493 | 387 |
| 2005 | Male | 63105 | 366 | 13967 | 16615 | 15387 | 14137 | 2556 | 60472 | 560 |
| | Female | 48458 | 117 | 8028 | 11346 | 12292 | 13758 | 2896 | 45541 | 475 |

Grades of Candidates by Gender in Percentage

Core Mathematics

| YEAR | SEX | GRADES IN PERCENTAGES | | | | | | | |
|------|--------|-----------------------|-------|-------|-------|-------|-------|-------|------|
| | | A | B | C | D | E | F | A-E | ABS |
| 2001 | Male | 8.65 | 10.91 | 7.28 | 8.10 | 20.54 | 44.08 | 55.48 | 1.35 |
| | Female | 3.96 | 5.75 | 4.52 | 6.14 | 19.31 | 60.15 | 39.68 | 1.05 |
| 2002 | Male | 6.20 | 10.02 | 7.45 | 9.35 | 23.88 | 42.71 | 56.90 | 0.95 |
| | Female | 3.10 | 5.28 | 4.43 | 6.57 | 21.08 | 59.32 | 40.46 | 0.74 |
| 2003 | Male | 8.77 | 11.52 | 7.78 | 9.55 | 23.01 | 38.53 | 60.63 | 0.89 |
| | Female | 4.37 | 6.28 | 5.08 | 7.65 | 21.34 | 54.54 | 44.72 | 0.73 |
| 2004 | Male | 15.24 | 15.95 | 10.06 | 12.72 | 23.87 | 21.96 | 77.85 | 0.92 |
| | Female | 7.88 | 12.08 | 8.90 | 12.85 | 27.78 | 30.43 | 69.50 | 0.78 |
| 2005 | Male | 8.20 | 11.25 | 8.04 | 11.56 | 27.46 | 33.00 | 66.52 | 0.69 |
| | Female | 4.31 | 7.18 | 5.79 | 9.08 | 26.69 | 46.56 | 53.07 | 0.75 |

Integrated Science

| YEAR | SEX | GRADES IN PERCENTAGES | | | | | | | |
|------|--------|-----------------------|-------|-------|-------|-------|-------|-------|------|
| | | A | B | C | D | E | F | A – E | ABS |
| 2001 | Male | 2.35 | 7.77 | 7.61 | 10.98 | 28.99 | 41.90 | 57.70 | 1.39 |
| | Female | 1.13 | 3.76 | 3.75 | 6.56 | 25.82 | 58.86 | 41.02 | 1.09 |
| 2002 | Male | 2.97 | 9.84 | 8.68 | 13.43 | 33.24 | 31.61 | 68.16 | 0.92 |
| | Female | 1.28 | 4.61 | 5.01 | 9.30 | 31.61 | 48.11 | 51.81 | 0.75 |
| 2003 | Male | 4.34 | 12.58 | 10.50 | 15.49 | 33.28 | 23.32 | 76.19 | 0.98 |
| | Female | 2.31 | 6.71 | 6.54 | 12.21 | 35.05 | 36.96 | 62.82 | 0.82 |
| 2004 | Male | 3.81 | 10.12 | 9.07 | 12.76 | 32.33 | 31.46 | 68.10 | 0.99 |
| | Female | 1.88 | 5.25 | 5.64 | 9.07 | 31.56 | 46.41 | 53.41 | 0.83 |
| 2005 | Male | 3.75 | 15.48 | 14.96 | 19.31 | 34.38 | 11.97 | 87.90 | 0.73 |
| | Female | 1.96 | 8.90 | 10.36 | 17.00 | 41.70 | 20.03 | 79.93 | 0.80 |

English Language

| YEAR | SEX | GRADES IN PERCENTAGES | | | | | | | |
|------|--------|-----------------------|------|------|-------|-------|-------|-------|------|
| | | A | B | C | D | E | F | A – E | ABS |
| 2001 | Male | 0.66 | 5.93 | 7.59 | 12.34 | 35.55 | 37.46 | 62.07 | 1.09 |
| | Female | 1.16 | 6.52 | 7.49 | 10.92 | 33.68 | 40.05 | 59.77 | 0.95 |
| 2002 | Male | 0.51 | 4.56 | 5.98 | 11.10 | 35.46 | 42.15 | 57.61 | 0.70 |
| | Female | 0.67 | 5.05 | 5.86 | 10.54 | 34.11 | 43.70 | 56.23 | 0.61 |
| 2003 | Male | 0.74 | 4.54 | 6.03 | 10.03 | 34.11 | 43.86 | 55.45 | 0.67 |
| | Female | 0.74 | 4.97 | 5.49 | 9.04 | 31.35 | 47.84 | 51.59 | 0.64 |
| 2004 | Male | 0.74 | 5.93 | 7.49 | 12.12 | 37.39 | 36.14 | 63.69 | 0.67 |
| | Female | 0.94 | 6.48 | 7.15 | 11.48 | 36.10 | 37.81 | 62.17 | 0.59 |
| 2005 | Male | 0.30 | 4.38 | 6.46 | 11.31 | 36.88 | 40.35 | 59.35 | 0.55 |
| | Female | 0.73 | 4.38 | 5.65 | 10.16 | 36.02 | 42.78 | 59.95 | 0.63 |

Social Studies

| Year | Male | GRADES IN PERCENTAGES | | | | | | | |
|------|--------|-----------------------|-------|-------|-------|-------|-------|-------|------|
| | Female | A | B | C | D | E | F | A - E | ABS |
| 2001 | Male | 0.11 | 7.91 | 13.61 | 21.35 | 35.99 | 20.61 | 78.97 | 1.43 |
| | Female | 0.05 | 5.41 | 10.67 | 18.55 | 38.28 | 26.92 | 72.96 | 1.09 |
| 2002 | Male | 0.47 | 14.87 | 17.21 | 22.29 | 30.80 | 14.15 | 85.64 | 0.98 |
| | Female | 0.36 | 10.43 | 14.12 | 20.62 | 34.52 | 19.88 | 80.05 | 0.85 |
| 2003 | Male | 0.05 | 6.71 | 14.73 | 19.89 | 37.28 | 20.87 | 78.66 | 1.11 |
| | Female | 0.05 | 5.04 | 10.90 | 17.28 | 38.68 | 27.86 | 71.95 | 0.98 |
| 2004 | Male | 0.09 | 10.98 | 19.37 | 26.55 | 33.91 | 8.85 | 90.92 | 1.17 |
| | Female | 0.10 | 7.35 | 15.57 | 24.58 | 39.71 | 12.63 | 87.34 | 0.91 |
| 2005 | Male | 0.57 | 22.13 | 26.32 | 24.38 | 22.40 | 4.05 | 95.82 | 0.87 |
| | Female | 0.24 | 16.56 | 23.41 | 25.36 | 28.39 | 5.97 | 93.97 | 0.97 |

APPENDIX B

(I)

Chi-Square Test (Table 4.1)

Expected counts are printed below observed counts.

| | Male | Female | Total |
|-------|---------|---------|-------|
| 1. | 7386 | 2776 | 10162 |
| | 6592.50 | 3568.61 | |
| 2. | 5809 | 3049 | 8858 |
| | 5747.27 | 3111.08 | |
| 3. | 7754 | 5375 | 13269 |
| | 8609.23 | 4660.30 | |
| Total | 20949 | 11340 | 32289 |

Chi-square = 515.775

(II)

Chi-Square Test (Table 4.2)

Expected counts are printed below observed counts.

| | Male | Female | Total |
|----|----------|---------|-------|
| 1. | 6518 | 2588 | 9106 |
| | 5889.40 | 3216.05 | |
| 2. | 6753 | 3396 | 10149 |
| | 6564.54 | 3584.73 | |
| 3. | 9594 | 6502 | 6096 |
| | 10411.05 | 5685.21 | |

| | | | |
|------------|-------|---------|-------|
| Total | 22865 | 12486 | 35351 |
| Chi-Square | = | 386.822 | |

(III)

Chi-Square Test (Table 4.3)

Expected counts are printed below observed counts.

| | Male | Female | Total |
|------------|----------|---------|-------|
| 1. | 9170 | 3755 | 12925 |
| | 8206.01 | 4718.19 | |
| 2. | 7835 | 4486 | 1232 |
| | 7823.20 | 4498.09 | |
| 3. | 10400 | 7516 | 17916 |
| | 11375.79 | 6540.72 | |
| Total | 27405 | 15757 | 43162 |
| Chi-square | = | 539.555 | |

(IV)

Chi-square Test (Table 4.4)

Expected counts are printed below observed counts.

| | Male | Female | Total |
|----|----------|----------|-------|
| 1. | 16844 | 8353 | 25197 |
| | 14895.75 | 10300.12 | |
| 2. | 12309 | 9100 | 21409 |
| | 12657.07 | 8752.12 | |
| 3. | 12893 | 11621 | 24514 |

| | | | |
|-----------------------|----------|----------|-------|
| | 14493.18 | 10021.75 | |
| Total | 42046 | 29074 | 71120 |
| Chi-square = 1079.213 | | | |

(V)
 Chi-square Test (Table 4.5)
 Expected counts are printed below observed counts.

| | Male | Female | Total |
|----------------------|----------|----------|-------|
| 1. | 12295 | 5588 | 17883 |
| | 11086.97 | 6795.45 | |
| 2. | 12397 | 7226 | 19623 |
| | 12166.28 | 7456.99 | |
| 3. | 17359 | 12960 | 30319 |
| | 18797.75 | 11521.56 | |
| Total | 42051 | 25774 | 67825 |
| Chi-square = 647.700 | | | |

(VI)
 Chi-square Test (Table 4.6)
 Expected counts are printed below observed counts.

| | Male | Female | Total |
|----|---------|---------|-------|
| 1. | 3822 | 1398 | 5220 |
| | 339.16 | 1825.90 | |
| 2. | 7016 | 2947 | 9963 |
| | 6478.23 | 3484.98 | |

| | | | |
|----|----------|---------|-------|
| 3. | 10939 | 7370 | 18309 |
| | 11904.60 | 6404.12 | |

Total 21777 11715 33492

Chi-square = 505.951,

(VII)

Chi-square Test (Table 4.7)

Expected counts are printed below observed counts.

| | Male | Female | Total |
|----|----------|---------|-------|
| 1. | 5150 | 1819 | 6969 |
| | 4401.50 | 2567.54 | |
| 2. | 8889 | 4415 | 13304 |
| | 8402.63 | 4901.53 | |
| 3. | 133357 | 9747 | |
| | 14591.88 | 8511.93 | |

Total 27396 15981 43377

Chi-square = 705.703

(VIII)

Chi-square Test (Table 4.8)

Expected counts are printed below observed counts.

| | Male | Female | Total |
|----|---------|---------|-------|
| 1. | 7646 | 3178 | 10824 |
| | 6589.45 | 4234.40 | |

| | | | |
|-------|----------|----------|--------|
| 2. | 11738 | 6601 | 183339 |
| | 11164.62 | 7174.43 | |
| 3. | 15026 | 12333 | 27359 |
| | 16655.93 | 10703.17 | |
| Total | 34410 | 22112 | 56522 |

Chi-square = 915.952

(IX)

Chi-square Test (Table 4.9)

Expected counts are printed below observed counts.

| | Male | Female | |
|-------|-----------|----------|-------|
| 1. | 7521 | 2986 | 10507 |
| | 6535.29 | 3971.64 | |
| 2. | 11785 | 6153 | 17938 |
| | 11157.71 | 6780.67 | |
| 3. | 17446 | 13196 | 30642 |
| | 1.9059.20 | 11582.69 | |
| Total | 36752 | 22335 | 59087 |

Chi-square = 847.949,

(X)

Chi-square Test (Table 4.10)

Expected counts are printed below observed counts.

| | Male | Female | Total |
|-----------------------|----------|----------|-------|
| 1. | 12153 | 5274 | 17427 |
| | 10259.70 | 7167.19 | |
| 2. | 21660 | 13284 | 34944 |
| | 20572.38 | 14371.40 | |
| 3. | 21727 | 20241 | 41971 |
| | 24707.93 | 17260.40 | |
| Total | 55540 | 38799 | 94339 |
| Chi-square = 1863.660 | | | |

(XI)

Chi-square Test (Table 4.11)

Expected counts are printed below observed counts.

| | Male | Female | Total |
|---------------------|----------|---------|-------|
| 1. | 2497 | 2196 | 4693 |
| | 2717.21 | 1976.09 | |
| 2. | 7548 | 5268 | 12816 |
| | 7419.95 | 5396.16 | |
| 3. | 13460 | 9630 | 23090 |
| | 13367.84 | 9721.75 | |
| Total | 23505 | 17094 | 40599 |
| Chi-square = 49.265 | | | |

(XII)

Chi-square Test (Table 4.12)

Expected counts are printed below observed counts.

| | Male | Female | Total |
|-------|----------|----------|-------|
| 1. | 2045 | 1771 | 3816 |
| | 2179.84 | 1636.59 | |
| 2. | 6884 | 5126 | 12010 |
| | 6859.91 | 5750.32 | |
| 3. | 14288 | 10534 | 24822 |
| | 14177.25 | 10644.08 | |
| Total | 23217 | 17431 | 40648 |

Chi-square = 22.070

(XIII)

Chi-square Test (Table 4.13)

Expected counts are printed below observed counts.

| | Male | Female | Total |
|-------|----------|----------|-------|
| 1. | 2393 | 2017 | 4410 |
| | 2557.96 | 1852.42 | |
| 2. | 7277 | 5125 | 12402 |
| | 7193.15 | 5209.13 | |
| 3. | 15455 | 11053 | 26508 |
| | 15373.88 | 11133.45 | |
| Total | 25125 | 18195 | 43320 |

Chi-square = 29.023

(XIV)

Chi-square Test (Table 4.14)

Expected counts are printed below observed counts.

| | Male | Female | Total |
|-------|----------|----------|-------|
| 1. | 3616 | 3118 | 6734 |
| | 3835.83 | 2898.50 | |
| 2. | 10624 | 7810 | 18434 |
| | 10499.98 | 7934.20 | |
| 3. | 20250 | 15134 | 35384 |
| | 20154.19 | 15229.30 | |
| Total | 34490 | 26062 | 60552 |

Chi-square = 33.936

(XV)

Chi-square Test (Table 4.15)

| | Male | Female | Total |
|----|----------|----------|-------|
| 1. | 2967 | 2490 | 5457 |
| | 2543.98 | 2913.57 | |
| 2. | 11259 | 7688 | 18947 |
| | 10908.76 | 8038.24 | |
| 3. | 23355 | 17514 | 40869 |
| | 19050.48 | 21818.15 | |

Total 37581 27692 65273
 Chi-square = 53.264

(XVI)

Chi-square Test (Table 4.16)

| | Male | Female | Total |
|-------|----------|----------|-------|
| 1. | 3031 | 1564 | 4595 |
| | 2704.64 | 1890.82 | |
| 2. | 13194 | 8343 | 21537 |
| | 12675.20 | 8861.24 | |
| 3. | 13579 | 10929 | 24508 |
| | 14424.16 | 10083.94 | |
| Total | 29804 | 20836 | 50640 |

Chi-square = 268.255

(XVII)

Chi-square Test (Table 4.17)

Expected counts are printed below observed counts.

| | Male | Female | Total |
|----|---------|---------|-------|
| 1. | 6166 | 3327 | 9493 |
| | 5528.85 | 3964.19 | |
| 2. | 15871 | 10708 | 26579 |

| | | | |
|----------------------|----------|----------|-------|
| | 15479.49 | 11098.81 | |
| 3. | 12373 | 10637 | 23010 |
| | 13401.66 | 9609.00 | |
| Total | 34410 | 24672 | 59082 |
| Chi-square = 388.814 | | | |

(XVIII)

Chi-square Test (Table 4.18)

| | Male | Female | Total |
|----------------------|----------|----------|-------|
| 1. | 3051 | 1791 | 4842 |
| | 2827.82 | 2014.70 | |
| 2. | 15614 | 9899 | 25513 |
| | 14898.17 | 10614.31 | |
| 3. | 16815 | 13588 | 30403 |
| | 17754.01 | 12648.98 | |
| Total | 35480 | 25278 | 60758 |
| Chi-square = 245.104 | | | |

(XIX)

Chi-square Test (Table 4.19)

Expected counts are printed below observed counts.

| | Male | Female | Total |
|----|------|--------|-------|
| 1. | 5971 | 3119 | 9091 |

| | | | |
|----------------------|----------|----------|-------|
| | 5209.47 | 3880.89 | |
| 2. | 24740 | 16779 | 41519 |
| | 23793.04 | 17725.05 | |
| 3. | 18275 | 16595 | 34870 |
| | 19983.49 | 14887.06 | |
| Total | 48986 | 36493 | 85479 |
| Chi-square = 691.708 | | | |

(XX)

Chi-square Test (Table 4.20)

Expected counts are printed below observed counts.

| | Male | Female | Total |
|----------------------|----------|----------|----------|
| 1. | 14333 | 8145 | 22479 |
| | 12821.76 | 9655.97 | |
| 2. | 32002 | 2368 | 55642 |
| | 31737.55 | 23901.30 | 17725.05 |
| 3. | 14137 | 13758 | 27898 |
| | 15912.69 | 11983.73 | |
| Total | 60472 | 45541 | 106019 |
| Chi-square = 882.263 | | | |