

**GENDER CHEMISTRY CONCEPTS' PERCEPTION AND ITS EFFECTS ON  
STUDENTS ACADEMIC PERFORMANCE IN SELECTED  
SECONDARY SCHOOLS OF CENTRAL DIVISION,  
MOMBASA DISTRICT, KENYA**

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**A RESEARCH REPORT PRESENTED TO THE INSTITUTE OF OPEN AND  
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UNIVERSITY**

**AUGUST, 2009**

## DECLARATION

I, declare that this project is my original work and has never been presented to any other university for award of any academic certificate or anything similar to such. I solemnly bear and stand to correct any inconsistency.

Signature

.....*Matunda*.....

**DONATHA MATUNDA MIKENYI**

DATE *19<sup>th</sup> AUG 2009*.....

## APPROVAL

This research report is submitted for examination with my approval as the University student's Supervisor.

Signed

..........

**MR. KATEREGGA**

SUPERVISOR

DATE:

..........

## DEDICATION

This work is affectionately dedicated to my beloved <sup>husband</sup> and children for their support patience and understanding during this period of study.

## ACKNOWLEDGMENT

First of all I give thanks to the almighty God for his mercy and grace granted to me during this time of my degree course and through this research project

I would like to thank my supervisor MR. Kateregga for being there for me whenever I needed her and also offering his professional advice where necessary.

I would like also to thank my parents, brother and sisters and my husband and children for their support and prayers towards the success of my course.

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May God bless you all

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## ABSTRACT

*The major purpose of the study was to investigate Gender chemistry concepts' perception and its effects on academic performance of students in selected Secondary schools of Central Division, Mombasa District.*

*The specific objectives of the study were to examine the factors affecting gender and academic performance in chemistry, to analyze student's attitude towards the academic performance of chemistry and to analyze the solutions to the factors affecting gender and academic performance in chemistry.*

*The methods used for data collection were questionnaires to students and interviews were held with the teachers.*

*The study revealed that some cultural norms discourage female students in chemistry as they compare boys to be superior to girls in all the aspects of life*

*The study revealed that sex difference affects gender and academic performance in chemistry.*

*Boys perform better than girls because some girls think that chemistry is for only boys.*

*It was also revealed that biological factors and Cognitive affect performance in chemistry*

*The study revealed that some student especially the girls believe that the subject is difficult so they do not put in any effort to improve in the subject thus poor performance*

*The study also revealed that some teachers have some negative attitudes towards students especially the girls in chemistry and therefore girls tend to hate the subject and hence poor performance*

*The study revealed that most of the girls in all schools have a belief that chemistry is for the boys and believe that it is the boys who like chemistry since it is difficult.*

*Trained and qualified teachers should be employed*

*Teachers should always encourage the student towards the subject other than discouraging them*

*The government should build single sex schools since students understand well by their same sex students*

*Students especially the girls who have a biased attitude towards chemistry should stop hating the subject and discouraging their friends*

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background to the study

The influence of feminism on approaches for achieving equity in chemistry is most evident in the area of pedagogy. There is a desire by many feminists to see a fundamental change in the distribution of power in the classroom and consequently in the organization of the discipline of chemistry. Some contemporary research on gender reform appears to be influenced by some forms of feminism. (Veroff 1977).

There are suggestions of how to apply women's ways of knowing, the development of a creative-intuitive pedagogy, curricula changes which are gender inclusive and socially critical, use of independent activities like games at the elementary level, examination of the structures of learning experiences, change in the discipline of chemistry based on philosophical, pedagogical and epistemological questions, an examination of personal experience as the basis of knowledge, and using wider social structures and strategies for intervention. Tobias (1987).

Re-dressing the Gender Imbalance in Chemistry although there are several differing feminist theories, they share an underlying bond when redressing the gender imbalance in the teaching and learning of chemistry as part of a global project of achieving educational and occupational equity. Feminists of equality demand legal and actual equality between the sexes and identify the sexual division of labour as the main source of women's oppression. They seek to redress imbalances from an intervention perspective, aimed at increasing the participation of women in chemistry and focus on programmes aimed at resocializing girls. (Walkerdine (1985).

Tobias (1987) illustrates this perspective by focusing on an attitude of the individual student, namely chemistry anxiety, as the source of chemistry avoidance, by assuming that this attitude is learned and therefore changeable (Rogers, 1995).

The aim of this study therefore was to explore some of the factors responsible for gender differences in the performance of chemistry in secondary schools.

### **1.2 Statement of the problem**

Burton, L. (ed) (1990), research on affect has been voluminous but not particularly powerful in influencing the field of chemistry education. He suggests that future research on affect should be linked more closely to the study. Therefore the gender academic performance in chemistry is increasing but what are the influential factors.

### **1.3 Objectives of the study**

#### **General objective**

This was to investigate Gender chemistry concepts' perception and its effects on academic performance of students in selected Secondary schools of Central Division, Mombasa District Kenya.

#### **Specific objectives:** this study sought to

1. To examine the factors affecting gender and academic performance in chemistry.
2. To analyze students attitude towards the academic performance of chemistry.
3. To analyze the solutions to the factors affecting gender and academic performance in chemistry.

### **1.4 Research Questions**

1. What are the factors affecting gender and academic performance in chemistry?
2. What are the students' and teacher's attitudes towards the academic performance of chemistry?
3. What are the solutions to the factors affecting gender and academic performance in chemistry?

### **1.5 Scope of the study**

The study was carried in Central Division, Mombasa District Kenya. The District is one of the Districts that make up the Coast Province. The District has an estimated population of 745,713 persons as per the 1999 census and covers an area of 1860.10 km<sup>2</sup>. The purpose of the study was to the level of gender performance and academic performance of chemistry in the selected secondary. The study was carried out between April 2009 and August 2009.

### **1.6 Significance of the study**

The study Provides information that can be used by Ministry of Education policy makers to identify attitudes that can be associated more with high performance of girls in chemistry among students.

Increase awareness of the Head teachers, Board of Governors and PTA and Teachers on attitudes associated with high performance in chemistry by girls.

In brief the chemistry teacher performance will be reviewed, priority areas for improvement will be identified and improvement plan containing objectives may be developed for each priority area.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

This chapter discusses the literature related to the study. A lot of literature has been written on children with disabilities, especially the mentally challenged. For the purpose of the study the following concepts are discussed.

#### **2.1 Biological Explanations and Gender achievement**

According to APU (1988) there has been many attempts to explain chemistry attainment differences by offering biological theories, which have ranged from sex differences related to reproduction, to physiological sex differences which account for certain diseases, illnesses, inherited conditions, and survival rates: for example, as males become more mature at a slower rate, they are more prone to speech defects, vision and reading problems etc; there have also been theories suggesting that a recessive gene for superior visual-spatial ability lies on the X chromosome, thus increasing boys' chances of superior visual-spatial ability; other theories suggest that differences may be traced to prenatal and/or postnatal hormone differences in the lateralization of the cerebral hemispheres of the brain. There is no clear evidence supporting any one of these theories, however, and, as mentioned earlier, most researchers are dismissive of them.

Barnes, M., & Horne, M. (1996), Sex differences in behavioral patterns are influenced by biology; women are more nurturing than men due to hormonal response and there is a great deal of evidence suggesting that males are more aggressive than females

Armstrong, J. (1985). These biological influences may increase the tendency of boys to experience more behavior problems, their greater incidence of learning disabilities, and their greater interest in chemistry and science. Sex differences in chemistry achievement that are physiologically influenced can be minimized if teaching methods draw on skills other than visual-spatial skills; the differences are thus negated somewhat when students

are taught by same-sex teachers who present material in a way more easily understood by their same-sex students. Another interesting difference to be considered relating to achievement of males and females is the different way they cognitively define and experience achievement or successful accomplishments; Veroff (1977)] suggests that males tend to emphasize the impact of their achievement, including what it accomplished and how it compared to the work of others, while females emphasize the process of achievement, including whether or not they accomplished a task alone and if they tried as hard as they could.

According to McLeod, (1988) research on affect has been voluminous but not particularly powerful in influencing the field of chemistry education. He suggests that future research on affect should be linked more closely to the study of cognitive factors in learning so that the affective domain can receive more attention in curriculum development, teacher education, and research on teaching and learning in this field.

## **2.2 Sex Differences in Chemistry Performance and Gender Achievement**

There is contradictory evidence from research in this area. According to the APU primary surveys, there was very little difference in the level of chemistry I performance with 11 year olds; by contrast, there were significant differences within performance. Walden and Walkerdine (1985) pointed out that boys fared better where spatial ability was required and that the only area where girls experienced a higher rate of success was algebra. During the period 1978-82 the APU, nevertheless, found there to be very little difference in achievement according to gender.

Women's under participation in chemistry courses at a tertiary level of education shows a marked inconsistency with those attaining

General Certificate of Education 'O' levels and General Certificate of Secondary Education grades A-C (Ernest, 1994). Although girls' overall results have been higher than those of boys for some time, until recently, boys had consistently outperformed girls in chemistry and science. In 1995, girls equaled boys at 'O' level standard [KCSE] for the



first time and, according to Barnes, M., Plaister, R. and Thomas, A.(1984), boys will continue to lag behind until the government introduces an intensive programme to improve male literacy at primary school [Electronic Telegraph, 1995]. He stated that the improved achievement of girls, particularly in subjects like chemistry and science was a reflection of a ten year concentrated effort by educationalists to remediate girls' perceived weaknesses; consequently; boys' superiority in these subjects at General Certificate of Secondary Education level has all but disappeared. This explanation is worth criticizing because he overestimates the impact of educational opportunity measures and he neglects economic and social factors which have depressed boys' achievement differentially [especially for the lower socio-economic groups]. In spite of these statistics, women number only 44% of the students in higher education in the U.K. (Ernest, 1994); in 1989-90 this accounted for a difference of 112,000 persons.

Comparing sex differences in achievement in other countries it would appear that the differences are greatest in the U.S. Most studies agree that girls' greater verbal fluency appears at about age 10-11 and continues through high school and college; likewise, males rise above the national average in chemistry and science at approximately the same time. Some countries, such as Nigeria and England, conducted studies where boys scored higher in reading achievement (Johnson 1973-74), also reporting that both boys and girls in single-sex classes made better academic progress than their counterparts in mixed classes. Germany, Canada and Sweden (Hoiland, 1973] reported the girls-language, boys-chemistry /science difference, but most other European countries showed no significant or inconsistent differences in chemistry achievement.

Leder (1992)states that initial gender stereotypes and their expectations become self-fulfilling, shaped by teachers' as well as students' behaviors, suggesting that much research emphasizes gender differences instead of similarities. Current research methodology needs to be sufficiently flexible to keep abreast of a changing ethos in the classroom and to concentrate on factors which remain inequitable and provide some constructive ways of redressing them.

### **2.3 The Cultural Context and Gender achievement**

Kaely (1988) compared the cultural influences contributing to gender differences in learning chemistry within different cultures, observing that the developing world witnesses a greater disparity in the education of both sexes than is apparent in the developed world, where most gender differences favoring boys have disappeared at high school level. He points out the situation in certain matrilineal societies where females achieve the same or better chemistry results than their male counterparts; in the US, Hawaii is the only state in which gender differences in chemistry favour girls.

Forbes (1995) examined gender differences in chemistry performance between the two different ethnic groups in New Zealand, finding that the average performance of Maori girls was lower than that of Maori boys, whereas for girls and boys of European origin the average performance was the same. It thus appears that strategies to increase the participation and achievement of girls in chemistry in New Zealand have had a positive impact on girls of European descent, but have not met the needs of Maori girls (Kaiser and Rogers, 1995, p 109).

Leder (1992) examined the influences of print media on gender differences in learning chemistry, comparing two countries, Australia and Canada, and distinguishing among the media images using feminist and societal-psychological lenses. She concluded that the subtle messages conveyed by the popular press are consistent with small but persistent differences in the way males and females value chemistry.

As far as the relationship between gender differences in chemistry performance and enrolment and culture is concerned, Kaeley (1988) suggests four hypotheses which have been substantiated by many other researchers. Firstly, the cultural norms in many developing countries are responsible for producing enrolment disparities; "The women-only environment, which was both reassuring and stimulating, gave women an intellectual legitimacy which enabled them to enter mixed competitive environments such

as professional recruitment examinations. Even if they met with less success than their male counterparts, the proportion of women who did achieve success was greater than would be expected given their actual numbers in the preparatory classes"(Imbert, 1994). Secondly, in the developed world, cultural norms operate to discourage female students in chemistry to the point that their enrolment in chemistry courses declines as soon as the subject becomes optional. Thirdly, in societies where the role of women has changed, gender differences in chemistry performance begin to decrease. Finally, in certain societies and cultural groups in which women have more power and authority, females outperform males in chemistry.

Delon (1993)describes the impact on women's participation in chemistry education after the recent desegregation of the most respected universities in France. Following this action, there was a significant decrease in the numbers of female students studying chemistry and, ultimately, in the numbers of female students pursuing careers in universities, schools, and prestigious professions. The previous single-sex learning environment had been reassuring and stimulating to women and had empowered many of them to enter mixed competitive working environments common in the French society.

Barsky et al. (1987) reported that France had a higher proportion of female university teachers and researchers in chemistry (24%) than many other countries. The explanation, in part, offered for this is the existence of the ENSs (Ecoles Normales Superieures) from which many of these teachers derive and which were single-sex institutions, the subsequent move to co-education having negative effects on the numbers of women studying chemistry. According to Ferrand, Imbert and Marry (1993), "This amounts to a decline in the number of female chemistry in these years of over 80%". Previously, females had been allowed to escape the severest forms of competition, and were offered honorable and reasonable professional prospects; with coeducation, however, they quickly became the victims of initiation rites and the targets of astonishing rudeness due to their minority status. Before co-education, the ENSs had 5 to 10 times the number of female students than they do today and had produced many of the all too few scientifically renowned female figures, as well as facilitated the establishment of women

in the university sphere. The recent decrease is now causing researchers to reassess their present system (Delon, 1995).

#### **2.4 Student's attitudes towards chemistry**

According to Armstrong, J. (1985), Attitudes toward chemistry, including perceptions of how appropriate chemistry is for females, play a prominent role in females' lower performance and participation in chemistry in relation to males. Based on their analysis of NAEP data trends, Bae, Choy, Geddes, Sable, and Snyder (2000) contend, "Achievement gaps appear more closely related to attitudes than to course taking". The data show that females are less likely than males to like or to think they were good at chemistry. Females also experience chemistry anxiety to a greater degree than males (Levine, 1995).

Females' dispositions toward—and hence achievement and participation in—chemistry are believed to be socialized, inculcated by a society that tends to view chemistry as a male domain and which perpetuates the idea that males are naturally more chemistry inclined (Hanson, 1997). This is true because girls who do well in chemistry are referred to as boys.

Griffiths (1992), indicates that research carried out on 750 students at Edinburgh University between 1987 and 1991 showed that female students rated their own IQs lower than those of their fathers and, in three of the five years, higher than those of their mothers. (Arnot, M. 1983), Conversely, male students rated themselves superior to their mothers and, in three of five years, to their fathers too. This suggests a widely accepted belief that men are more intelligent than women. The issue is made worse by the fact that the women being tested, presumably the intellectual elite, should be more aware of gender issues and research, or at the very best, should be more confident of their own ability.

Barnes, M, Plaister .R. and Thomas. A (1984). identifies three types of component attitudes, emotions and beliefs relating to attitude to chemistry. Firstly, emotions are intense feelings, either positive or negative, which are evoked by a situation such as being confronted with a chemistry task. Secondly, are attitudes, which are predispositions to act in certain ways given certain concepts, ideas or situations? Attitudes can be held towards chemistry and include Liking/disliking of chemistry, Confidence (or lack of) in own ability, anxiety towards chemistry and perceived utility of chemistry.

Thirdly, there are systems of ideas or beliefs which reflect a person's values and outlook, including beliefs about gender roles and the appropriateness of chemistry for men and women. (APU 1988). Some content that the importance of attitude towards chemistry is its connection to achievement; for example, Bell et al (1983) and McLeod, (1992) found a low but significant correlation between these two factors – thus, more positive attitude may produce a higher level of achievement which is further compounded by gender. Research ambivalent, however, on the attitude – achievement link and there is much stronger argument that links attitudes to chemistry with future participation. (Otieno, K 1997). I concur with the researchers that girls negative attitudes towards chemistry affects their performance.

## **2.5 Teacher's attitudes towards student's performance in chemistry**

The personality of the teachers teaching chemistry is worrying. The teachers have weak academic backgrounds on the chemistry content to deliver Barnes, M., & Horne, M. (1996). Their own attitudes to chemistry may contribute to their inability to motivate the pupils to learn chemistry. The teaching methods that are used remain predominantly the traditional 'talk and chalk' mode of delivery. The teachers are under pressure to enable their pupils pass examinations and are therefore forced to water down the implemented curriculum. Anderson W.L (1991) Although teachers attempt to cover all the content of the syllabus, the frequent disruptions in the teaching time due to un-gazetted holidays, late start of the term and so on do not allow the completion of the syllabus in most schools. The characteristics of the pupils retard the pace of coverage of the content. R., Ndawula, R. & Bbosa, D. (2007). The fact that few pupils can not effectively read and write by the time they are in primary six or seven, which is the top class in the primary school level, spells out problems of the ability to comprehend what is taught.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.0 Introduction**

This chapter discusses the methods the researcher used to collect data. It focuses on the Research design, organization of the study, data collection, and data collection procedure and data analysis

#### **3.1 Research Design**

The research was presented in both qualitative and quantitative design. Qualitative design helped the researcher get a deeper meaning of the study while quantitative helped in analyzing the numbers that were involved in the study. Primary data was collected through both structured and unstructured interviews. National and international documents were consulted.

#### **3.2 Area of study**

This study was conducted in Central Division, Mombasa District Kenya. The case study was selected because that is where the researcher lives and therefore it made it easy to get information from the respondents. The costs of research were reduced that is the researcher needed to take few trips. the district has an estimated population of 745,713 persons per the 1999 census and covers an area of 1860.10Km. the pourpose of the study was to the level of gender performance and academic performance of chemistry in the selected secondary schools, carried out between April 2009 and August 2009.

#### **3.3 Sample selection**

The respondents included students and teachers. The teachers were selected using purposive sampling while the students were selected randomly.

#### **3.4 Data Collection**

##### **3.4.1 Research instruments**

Questionnaires were used to extract information from students and this was so because they helped obtain data within a short time and interviews were held with the teachers.

##### **3.5. Data Collection Procedures**

Questionnaires were distributed to students and interviews carried on with the teachers. The data collected was sorted and categorized after which it was analyzed. The conclusions and recommendations were made.

### 3.6. Methods of data analysis

Data analysis was done using SPSS (Statistical Package for the Social Scientists) for the Quantitative data. Quantitative data was analyzed to generate information about teacher learner relationship. Data was tabulated using frequency counts and percentages.

Qualitative data was analyzed basing on the items derived from the objectives of the study. The information got was used to supplement and complement what was derived from quantitative data.

### 3.7 Statistical Treatment of Data

The mean score of the number of individuals that gave a particular response were obtained. The following formula were used to obtain the mean score.

$$\overline{X} = \frac{X_1 + X_2 + \dots + X_n}{\Sigma N \Sigma n}$$

Where

$\overline{X}$  = the mean score

$\Sigma$  = summation

n = sample size

$X_1$  = Sample



## CHAPTER FOUR; FINDINGS AND INTERPRETATIONS

### 4.1 Introduction

This chapter is a presentation; interpretation and discussion of the findings. The results are presented in form of tables and frequency counts and percentage. It focuses on Gender and academic performance of chemistry in the selected secondary school in Central Division, Mombasa District Kenya

### Profile of the respondents

Table 1: Shows the profile of the respondents.

Respondents	Frequency	Percentage
<b>Sex</b>		
Male	30	46
Female	35	54
<b>Total</b>	<b>65</b>	<b>100</b>
<b>Age</b>		
13 and below	13	20
14-17yrs	35	54
18 and above	17	26
<b>Total</b>	<b>65</b>	<b>100</b>
<b>Academic level</b>		
Form ii	23	35
Form iii	25	38
Form iv	17	26
<b>Total</b>	<b>65</b>	<b>100</b>

#### Source field data

Eighty 80 questionnaires were distributed to the pupils and 65 were filled and returned .This therefore represents 81 % of the total number of questionnaires that were distributed.

The study covered 65 randomly selected pupils of whom (46%) were male and (54%) were female

The age category of the respondents was divided in three groups that is 13 and below were 13 which was 20%, 14-17 yrs were (54%) and 18 and above were (26%) of the respondents.

The academic level of the respondents was divided in three categories that is standard six, standard seven and standard eight. (35%) of the respondents were in standard six, (38%) were in seven and (26%) were in standard eight.

Interviews were carried out with teachers both male and female.

The table below shows the performance of pupils in chemistry in 2006.

**Table 2: performance of pupils in chemistry in 2008**

Scores in &age	Form ii		Form iii		Form iv	
	F	M	F	M	F	M
40 and below	15	5	9	6	5	3
40-50	8	3	13	4	7	2
50-60	9	4	5	2	11	-
60-70	3	7	2	8	1	2
70 and above	1	5	-	4	1	3
Total no of students	60		53		35	

**Source: school registry.**

According to the table most girls scored between 40 and below and 40- 50. Those who had in the range of 60-70 and 70 and above were mostly boys. From the table it can be concluded that boys perform better in chemistry than girls.

### Factors affecting gender and academic performance in chemistry

The first research objective was to determine the factors affecting gender and academic performance in chemistry. To achieve this, respondents were asked questions related to the objective. Data collected was analyzed under the question: what are the factors affecting gender and academic performance in chemistry? The results are presented in the subsections below;

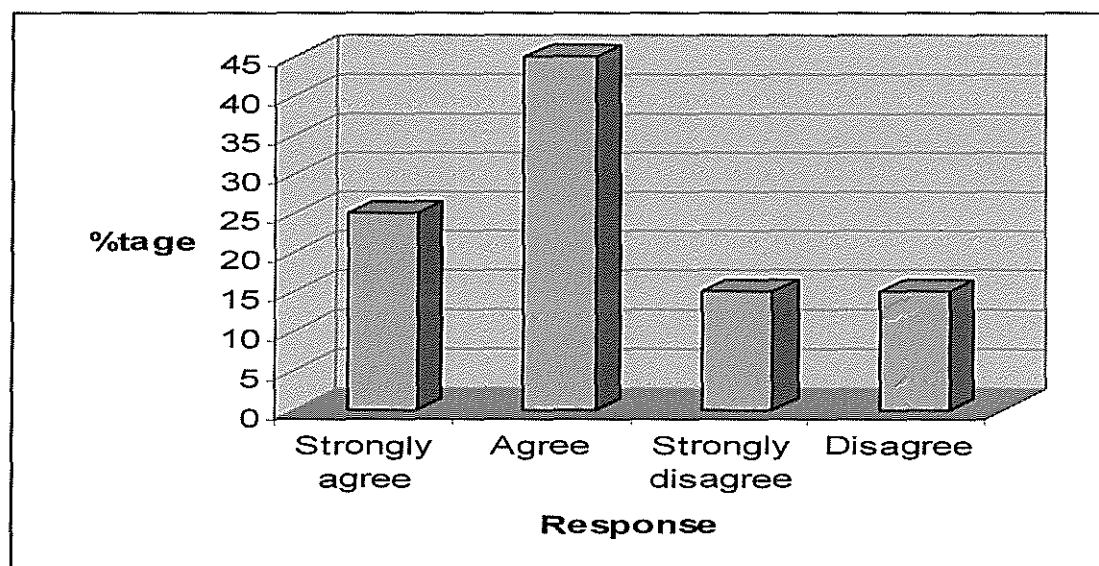
The respondents were asked whether cultural norms affect gender and academic performance in chemistry and below were their response

**Table 3: Cultural norms affect gender and academic performance in chemistry**

Response	Frequency	Percentage
Strongly agree	16	25
Agree	29	45
Strongly disagree	10	15
Disagree	10	15
Total	65	100

Source: primary data

**Chart 1: Cultural norms affect gender and academic performance in chemistry**



The table and chart shows that (25%) of the respondents strongly agree that cultural norms affect gender and academic performance in chemistry, (45%) agree while (15%) strongly disagree and (15%) disagree that cultural norms do not affect gender and academic performance in chemistry.

The teachers revealed that some cultural norms discourage female students in chemistry as they compare boys to be superior to girls in all the aspects of life.

According to Kaely (1988) compared the cultural influences contributing to gender differences in learning chemistry within different cultures, observing that the developing world witnesses a greater disparity in the education of both sexes than is apparent in the developed world, where most gender differences favoring boys have disappeared at high school level.

The respondents were asked whether sex difference affects gender and academic performance in chemistry and this was there response

**Table 4: Sex difference affects gender and academic performance in chemistry**

Response	Frequency	Percentage
Strongly agree	20	31
Agree	18	28
Strongly disagree	16	25
Disagree	11	16
Total	65	100

**Source: primary data**

The table indicates that (31%) of the respondents strongly agree that sex difference affects gender and academic performance in chemistry, (28%) agree while (25%) strongly disagree and (16%) disagree that sex difference does not affects gender and academic performance in chemistry

During the interviews with the teachers, they revealed that sex difference affects gender and academic performance in chemistry. Boys perform better than girls because some girls think that chemistry is for only boys.

Walden and Walkerdine (1985) pointed out that boys fared better where spatial ability was required and that the only area where girls experienced a higher rate of success was algebra. During the period 1978-82 the APU, nevertheless, found there to be very little difference in achievement according to gender.

The respondents were asked whether Biological factors affect gender and academic performance in chemistry and this was there response

**Table 5: Biological factors affect gender and academic performance in chemistry**

Response	Frequency	Percentage
Strongly agree	18	28
Agree	18	28
Strongly disagree	10	15
Disagree	19	29
Total	65	100

**Source: primary data**

The table show that (28%) of the respondents strongly agree that biological factors affect gender and academic performance in chemistry, (28%) agree while (15%) strongly disagree and (29%) disagree.

The teachers agreed that it is true biological factors affect performance in chemistry.

According to APU (1988) there have been many attempts to explain chemistry attainment differences by offering biological theories, which have ranged from sex differences related to reproduction, to physiological sex differences which account for certain diseases, illnesses, inherited conditions, and survival rates: for example, as males become more mature at a slower rate, they are more prone to speech defects, vision and reading problems etc; there have also

been theories suggesting that a recessive gene for superior visual-spatial ability lies on the X chromosome, thus increasing boys' chances of superior visual-spatial ability; other theories suggest that differences may be traced to prenatal and/or postnatal hormone differences in the lateralization of the cerebral hemispheres of the brain. There is no clear evidence supporting any one of these theories, however, and, as mentioned earlier, most researchers are dismissive of them.

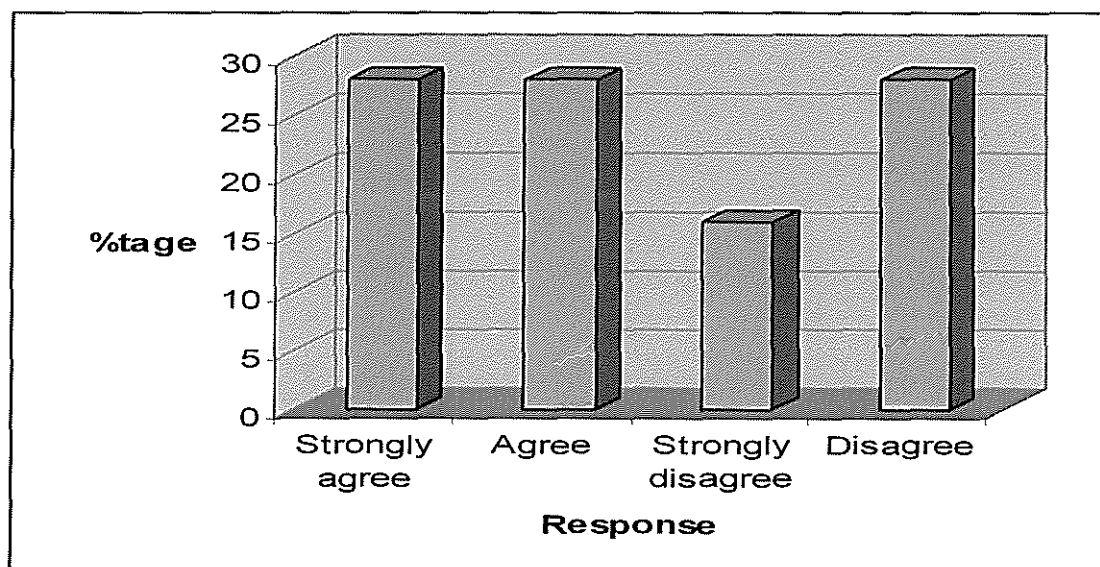
The respondents were asked whether cognitive factors affect gender and academic performance in chemistry and below were there response

**Table 6: Cognitive factors affect gender and academic performance in chemistry**

Response	Frequency	Percentage
Strongly agree	18	28
Agree	18	28
Strongly disagree	11	16
Disagree	18	28
Total	65	100

Source: primary data

**Chart 2: Cognitive factors affect gender and academic performance in chemistry**



The table and chart shows that (28%) of the respondents strongly agree that Cognitive factors affect gender and academic performance in chemistry, (28%) agree while (16%) strongly disagree and (28%) disagree.

According to McLeod, (1988) research on affect has been voluminous but not particularly powerful in influencing the field of chemistry education. He suggests that future research on affect should be linked more closely to the study of cognitive factors in learning so that the affective domain can receive more attention in curriculum development, teacher education, and research on teaching and learning in this field.

### **Student's attitude towards the academic performance in chemistry**

The second research objective was to identify student's attitudes towards academic performance in chemistry. To achieve this, respondents were asked questions related to the objective. Data collected was analyzed under the question: what are the student's attitudes on academic performance in chemistry? The results are presented in the subsections below;

The respondents were asked whether students perform poorly because they think chemistry is difficult and this was their response

**Table 7: Students perform poorly because they think chemistry is difficult**

Response	Frequency	Percentage
Strongly agree	25	38
Agree	20	31
Strongly disagree	9	14
Disagree	11	17
Total	65	100

**Source: primary data**



The table shows that (38%) of the respondents strongly agree that students perform poorly because they think chemistry is difficult, (31%) agree while (14%) strongly disagree and (17%) disagree.

The teachers revealed that some student especially the girls believe that the subject is difficult so they do not put in any effort to improve in the subject thus poor performance.

According to NAEP data trends, Bae, Choy, Geddes, Sable, and Snyder (2000) contend, the based on their analysis of “Achievement gaps appear more closely related to attitudes than to course taking”. The data show that females are less likely than males to like or to think they were good at chemistry. Females also experience chemistry anxiety to a greater degree than males (Levine, 1995).

The respondents were asked whether teacher’s attitudes towards some students in regards to chemistry do not encourage them and therefore perform poorly and this was their response

**Tables 8: Teacher’s attitudes towards some students in regards to chemistry do not encourage them**

Response	Frequency	Percentage
Strongly agree	21	32
Agree	29	45
Strongly disagree	5	8
Disagree	10	15
Total	65	100

**Source: primary data**

The table shows that (32%) of the respondents strongly agree that Teacher’s attitudes towards some students in regards to chemistry do not encourage them and therefore perform poorly, (45%) agree while (8%) strongly disagree and (15%) disagree.

The teachers in interviews revealed that some teachers have some negative attitudes towards students especially the girls in chemistry and therefore girls tend to hate the subject and hence poor performance.

The teachers also revealed that teachers develop such attitudes because few of the teachers teach chemistry and many are untrained; these teachers use poor teaching methods and they lack support in form of continuous professional development through workshops, seminars and refresher courses.

According to Barnes, M., & Horne, M. (1996), the personality of the teachers teaching chemistry is worrying. The teachers have weak academic backgrounds on the chemistry content to deliver. Their own attitudes to chemistry may contribute to their inability to motivate the pupils to learn chemistry.

Some students especially girls think that science is for boys and therefore they end up performing poorly

Students perform poorly in chemistry because their friends discourage them

The respondents were asked whether some students especially girls think that science is for boys and therefore they end up performing poorly and this was their response

**Tables 9: Some students especially girls think that science is for boys**

Response	Frequency	Percentage
Strongly agree	25	38
Agree	15	23
Strongly disagree	15	23
Disagree	10	15
Total	65	100

**Source: primary data**

According to the table, 25(38%) of the respondents strongly agreed that some students especially girls think that science is for boys and therefore they end up performing poorly, 15(23%) agreed while 15(23%) strongly disagreed and 10(15%) of the respondents disagreed

During the interviews with the teachers, they revealed that most of the girls in all schools have a belief that chemistry is for the boys and believe that it is the boys who like chemistry since it is difficult. So they do not put in any effort to improve in the subject.

According to (Hanson, 1997), Females' dispositions toward—and hence achievement and participation in—chemistry are believed to be socialized, inculcated by a society that tends to view chemistry as a male domain and which perpetuates the idea that males are naturally more chemistry inclined This is true because girls who do well in chemistry are referred to as boys

The respondents were asked whether Students perform poorly in chemistry because their friends discourage them and this was their response

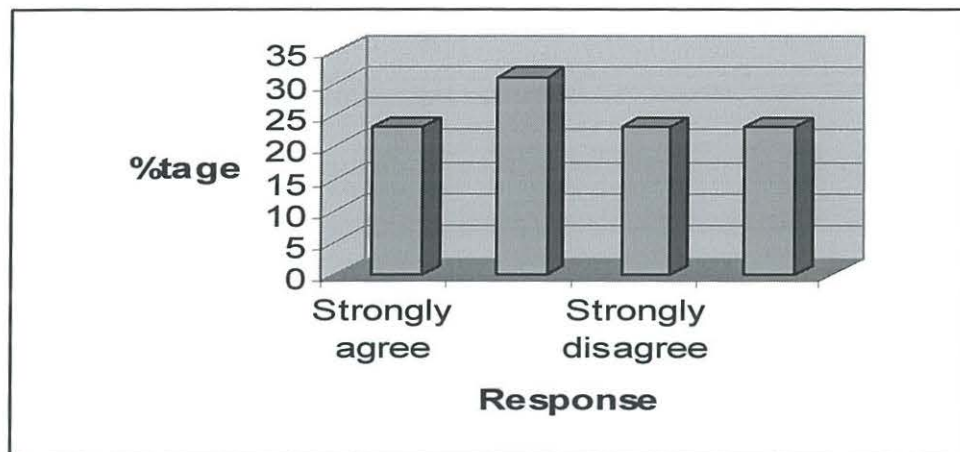
**Tables 10: Students perform poorly in chemistry because their friends discourage them**

Response	Frequency	Percentage
Strongly agree	15	23
Agree	20	31
Strongly disagree	15	23
Disagree	15	23
Total	65	100

**Source: primary data**



**Chart 3: Students perform poorly in chemistry because their friends discourage them**



The table and chart shows that (23%) of the respondents strongly agreed that Students perform poorly in chemistry because their friends discourage them, (31%) disagreed while (23%) strongly disagreed and (23%) of the respondents disagreed.

The teachers revealed that it is true some students discourage their friend by telling them that the subject is difficult and as a result, their friends also hate the subject leading to their poor performance.

### **Solutions to the factors affecting gender and academic performance**

Single sex schools should be built since students understand well by single students.

Sex differences in chemistry achievement that are physiologically influenced can be minimized if teaching methods draw on skills other than visual-spatial skills; the differences are thus negated somewhat when students are taught by same-sex teachers who present material in a way more easily understood by their same-sex students.

Students need to be encouraged not to have a negative attitude towards chemistry especially the girls and teachers should not have a negative attitude towards girls. Qualified teachers should be employed.

## **CHAPTER FIVE**

### **DISCUSSION, CONCLUSION AND RECOMMENDATIONS**

#### **5.0. Introduction**

The major purpose of the study was to investigate the level of gender performance and academic performance of chemistry in the selected secondary school in Central Division, Mombasa District Kenya. This chapter focuses on the discussions of the findings, conclusions and recommendations. Finally the chapter ends with suggestions for further research.

#### **5.1. Discussions**

The first research objective was to determine the factors affecting gender and academic performance in chemistry. The study revealed that some cultural norms discourage female students in chemistry as they compare boys to be superior to girls in all the aspects of life. According to Kaely (1988) compared the cultural influences contributing to gender differences in learning chemistry within different cultures, observing that the developing world witnesses a greater disparity in the education of both sexes than is apparent in the developed world, where most gender differences favoring boys have disappeared at high school level.

The study revealed that sex difference affects gender and academic performance in chemistry. Boys perform better than girls because some girls think that chemistry is for only boys. Walden and Walkerdine (1985) pointed out that boys fared better where spatial ability was required and that the only area where girls experienced a higher rate of success was algebra. During the period 1978-82 the APU, nevertheless, found there to be very little difference in achievement according to gender.

It was also revealed that biological factors affect performance in chemistry

The second research objective was to identify student's attitudes towards academic performance in chemistry. The study revealed that some student especially the girls believe that the subject is difficult so they do not put in any effort to improve in the subject thus poor performance. According to NAEP data trends, Bae, Choy, Geddes, Sable, and Snyder (2000) contend, the

based on their analysis of “Achievement gaps appear more closely related to attitudes than to course taking

The study also revealed that some teachers have some negative attitudes towards students especially the girls in chemistry and therefore girls tend to hate the subject and hence poor performance. It was also revealed that teachers develop such attitudes because few of the teachers teach chemistry and many are untrained; these teachers use poor teaching methods and they lack support in form of continuous professional development through workshops, seminars and refresher courses. According to Barnes, M., & Horne, M. (1996), the personality of the teachers teaching chemistry is worrying. The teachers have weak academic backgrounds on the chemistry content to deliver. Their own attitudes to chemistry may contribute to their inability to motivate the pupils to learn chemistry

The study revealed that most of the girls in all schools have a belief that chemistry is for the boys and believe that it is the boys who like chemistry since it is difficult.

## **5.2 Conclusion**

The major purpose of the study was to investigate the level of gender performance and academic performance of chemistry in the selected secondary school in Central Division, Mombasa District Kenya.

The study revealed that some cultural norms discourage female students in chemistry as they compare boys to be superior to girls in all the aspects of life

The study revealed that sex difference affects gender and academic performance in chemistry. Boys perform better than girls because some girls think that chemistry is for only boys.

It was also revealed that biological factors and Cognitive affect performance in chemistry

The study revealed that some student especially the girls believe that the subject is difficult so they do not put in any effort to improve in the subject thus poor performance



The study also revealed that some teachers have some negative attitudes towards students especially the girls in chemistry and therefore girls tend to hate the subject and hence poor performance

The study revealed that most of the girls in all schools have a belief that chemistry is for the boys and believe that it is the boys who like chemistry since it is difficult.

### **5.3 Recommendations**

Trained and qualified teachers should be employed

Teachers should always encourage the student towards the subject other than discouraging them

The government should build single sex schools since students understand well by their same sex students

Students especially the girls who have a biased attitude towards chemistry should stop hating the subject and discouraging their friends.

Future research is needed in relation to the gender performance and academic performance of chemistry



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## Office of the Director

TO WHOM IT MAY CONCERN:

Dear Sir/Madam,

RE: INTRODUCTION LETTER FOR MS/MRS/MR. DONATHA MATUNDA MACKENYI

REG. # BED/15372/TI/DF

The above named is our student in the Institute of Open and Distance Learning (IODL), pursuing a Diploma/Bachelors degree in Education.

He/she wishes to carry out a research in your Organization on:

GENDER CHEMISTRY CONCEPTS' PERCEPTION AND ITS  
EFFECTS ON STUDENTS ACADEMIC PERFORMANCE IN  
SELECTED SECONDARY SCHOOLS OF CENTRAL DIVISION,  
MOBASA DISTRICT, KENYA.

The research is a requirement for the Award of a Diploma/Bachelors degree in Education.

Any assistance accorded to him/her regarding research will be highly appreciated.

Yours Faithfully,

  
MUHWEZI JOSEPH  
HEAD, IN-SERVICE



## APPENDIX B: QUESTIONNAIRE TO THE STUDENTS

Dear respondent the purpose of the study is to investigate the level of gender performance and academic performance of chemistry in the selected secondary school in Central Division, Mombasa District Kenya. And you have been chosen to participate in the study. You are requested to tick where appropriately and fill in the gaps. I would like to bring to your attention that the information will be treated with utmost confidentiality.

NB. Do not write your name anywhere on this paper

### Personal information

#### Age

10 yrs and below [ ]

13-15yrs [ ]

16 and above [ ]

#### Sex

Female [ ]

Male [ ]

### Educational level

Standard six [ ]

standard seven [ ]

Standard eight [ ]

Evaluate the following statements indicating the number of the most appropriate answer.

Strongly agree	Agree	Strongly disagree	Disagree
1	2	3	

### **Factors affecting gender and academic performance in chemistry**

1. Cultural norms affect gender and academic performance in chemistry
2. Sex difference affects gender and academic performance in chemistry
3. Biological factors affect gender and academic performance in chemistry
4. Cognitive factors affect gender and academic performance in chemistry

### **Student's attitude towards the academic performance in chemistry**

5. Students perform poorly because they think chemistry is difficult
6. Teacher's attitudes towards some students in regards to chemistry do not encourage them and therefore perform poorly
7. Some students especially girls think that science is for boys and therefore they end up performing poorly
8. Students perform poorly in chemistry because their friends discourage them

### **Solutions to the factors affecting gender and academic performance**

9. state some of the solutions to the factors affecting gender and academic performance.....  
.....  
.....

# MAP OF KENYA

