

**ACADEMIC PERFORMANCE OF STUDENTS IN CHEMISTRY SUBJECT
OF JAMHURI HIGH SCHOOL IN NAIROBI CITY, KENYA**

A Research Paper
Presented to the
Institute of Continuing and Distance Studies
Kampala International University

In Partial Fulfillment
of the Requirements for the Degree
Bachelor of Education in Science

by



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Cybelle A. Gonzales, researcher's adviser, for guiding and correcting her throughout the research process.

Principal, Jamhuri High School, for allowing me to use his school to collect data for my research paper.

Joseph, researcher's husband, for giving me moral support and encouragement as I carried out the research.

Darlene and Kelvin, researcher's children for encouraging me throughout the study period.

DEDICATION

This research is dedicated to her husband Joseph and her children Darlene and Kelvin.

DECLARATION

I Grace Nungari Kungu solemnly declare that this research report is my original work to the best of my knowledge. This work has never been submitted for the award of any degree at Kampala International University or any other institution of higher learning.

GRACE NUNGARI KUNGU

Reg. No. : BED/7030/51/DF

Date : August 2007

This research project is presented for the examination with the approval of Kampala International University research supervisor.

CYBELLE A. GONZALES, BSED, MATS

Date : August 2007

ABSTRACT

Objectives: This study determined the academic performance of students in chemistry subject of Jamhuri High School in Nairobi District, Kenya. Specifically, this study determined the profile of the students as to age, gender and class. It determined the level of academic performance and determined if there is a significant difference in the level of academic performance between male and female students.

Design: This study employed the descriptive survey method of investigation.

Environment: This study was conducted at Jamhuri High School in Nairobi city, Kenya. The school offers the 8-4-4 system of education. The school offered a variety of subjects which are Biology, Chemistry, History, C.R.E, Physics, Computer studies, Geography and Mathematics.

Subjects: This study involved 82 students in the fourth year in high school namely: 40 from 4 West students and 42 from 4 East students.

Instrument: This study was a researcher devised instrument which was a record sheet which sought to determine the profile of the respondents as to age, gender, class and level of academic performance in chemistry subject.

Data Collection Procedures: The frequency and percentage was used to determine the profile of the respondents as to age, gender,

class and level of academic performance in chemistry subject. The paired or related t-test was used to test for significant difference in the level of academic performance between male and female students.

Findings: This study revealed the following: the mean age of the students was 17.93; the level of academic performance was fairly good (mean = 51); It was evident that there is a significant difference in the level of academic performance between male and female students.

Conclusion: Based on the findings, it was concluded that the academic performance of students in chemistry subject were rated as fairly good. However, it needs to be improved.

THE PROBLEM AND ITS SCOPE

INTRODUCTION

Rationale of the Study

The performance of the chemistry subject has continuously been dismal over the years despite the outcry from the ministry of education on the need for it to improve.

Most of the students in secondary schools opt for other science subjects citing that chemistry is a difficult subject. This leads to the students choosing a subject combination which later gives those problems when they want to continue with their education and specialize.

The most affected when it comes to shunning away chemistry are the girls who tend to suggest that the chemistry subject is mainly for boys.

Chemistry is the basis for industrial processes. This means that without the chemical know how, industries which largely depend on the personnel produced by the subject can not flourish.

The need to have the students develop positive attitude towards the subject is long overdue. This is because most of the students in the secondary schools continue to be below average.

The introduction of the new syllabus which has changed physical science to pure science has greatly contributed to the academic performance of chemistry in a great way. This is because most of the schools are ill equipped in their chemistry laboratories to teach pure chemistry.

The researcher who is a graduating student in the faculty of education at Kampala International University intends to find out the academic performance of boys in relation to girls. The researcher intends to find out the reasons for the performance.

Theory

This study is based on the theory of Mugo (2005), which states that the performance of girls in science subjects is very low compared to boys.

This unfounded and unconfirmed statement has always been made over the years making the girls to become convinced and believe that they can actually never be able to do better than boys.

Given a good scientific foundation in form one and two, the chemistry subject can be quite easy and interesting to the student and as such can perform far much better.

Since Kenya intends to be industrialized by the year 2020, then for this to be a realistic goal, both boys and girls need to be well versed in science subjects especially chemistry. It is usually said that "educating a woman is educating the whole nation". Women form the backbone of the family, meaning that if a girl performs well in chemistry this goes a long way in assisting her family to equally perform well in the subject, as they have an example to emulate.

Negative comments and segregation of girls from science oriented subjects like chemistry can be detrimental to the academic performance of the girls.

The teacher plays a major role in moulding the academic picture of the students. There are many chemistry teachers who are women and this encourages even the girls choosing the chemistry subject as the boys choose it.

Availability of materials for the chemistry practical can also play a major role in making the subject more interesting to both boys and girls.

Academic performance of girls in chemistry subject can be greatly improved if only their enrolment in science subjects was also improved.

Review of the Related Literature

According to Gachathi, which states that one of the basic requirements in making education relevant to the today's problems of learners is to enable the student to observe phenomenon of the environment, gather data about them, interpret the data and then use them to solve problems.

Teaching methods should be used to develop ability to gather information by observing experiment as well as the ability to draw valid scientific inferences from the observed data (Kenya education commission, 1964).

To teach curriculum content, a particular way of teaching has a significant effect on the entire and learning situation. Many educations emphasize the child centered approach to education. This kind of approach has the modern view of the teacher as a helper challenging the learner to discover himself/herself (Hayman, 1970).

The effectiveness of teaching and learning are determined by the type of teaching methods applied. Despite such advice teachers in most classroom situations today are still controllably, restricting, inhabiting and do most of the talking. Seventy percent of the talking in the average primary and secondary school is done by the teacher (Flauders, 1970).

The drill method of teaching neglect pupil participation methods for low education achievements in education. Teachers are encouraged to adjust their instructions to the need of particular children and to use activity method so as to make education child-centered (Mackay, 1980).

The teaching of chemistry in Kenya has been affected by certain attitudes. The environment, the teacher and experiments are likely to have dominating influence and create a favorable or negative attitude towards the science subject. Teachers should make chemistry a more enjoyable and far less dull and exhausting in order for the learner to acquire the scientific skills for themselves enabling them to go on learning after they have left school (Macgregor, 1975).

The teaching of chemistry is based on the PDSI approach (Plan Do See, Implement) which emphasizes on the student being completely involved in the progression of the lesson. The student is actively involved in the activities of the lesson results of the Chemistry subject (SMASSE, 2005).

Although a lot has been done to reduce the gender imbalance at the primary level, there are still fewer girls than boys out of school due

to several reasons such as cultural practices, poverty, long distance to school and HIV/AIDS. The gender disparity is also seen in terms of academic performance in national examinations and participation in certain science-oriented courses at the university and tertiary levels of education (Saitoti, 2003).

Due to inadequate teaching and learning materials and shortage of teachers, the secondary schools have found it difficult to maintain high quality. Moreover, performance in national examinations indicates that students do poorly in mathematics and science subjects yet these are critical in placement and admission to competitive courses at universities and other training colleges (Mugo, 2005).

Teaching chemistry requires more input than other subjects because the teacher has to prepare for practical work and to care for equipment and laboratory. Yet they have the same number of periods and classes as teachers of other subjects. These problems need to be addressed. Science teachers should be allocated fewer lessons and paid a laboratory allowance (Ng'ang'a, 2006).

There are many things that hinder the learning and teaching of science in Kenya schools. Belief in information particularly in text-books is entrenched. It is not unusual for teachers to tell pupils that something is right because the book says so. Any attempt to correct a book is often met with disbelief. Whether a practical is done or not, lessons are often statements of facts or absolute truths from books not to be challenged of course a school laboratory rarely has the resources to challenge such laws and learner has to believe (Kipkulei, 2003).

There has been an increased entry and a closing gender performance gap in most subjects at GCSE, apart from chemistry and economics, which are still largely taken by boys and social sciences which is largely taken by girls. Male students continue to achieve relatively less well in English and the arts. Single sex Girls' schools continue to be particularly successful in examination performance. At A-Level there is higher male entry into sciences (Physics, Technology, Computer studies, Chemistry and Mathematics). Significantly, there is a higher female entry for arts and humanities. Males gain higher A-level grades than females in nearly all subjects especially in mathematics, chemistry, technology, history, English and modern foreign languages. However this grade superiority is being eroded, with a marked improvement in female performance at A-level (Wilcox, 1995).

It seems that girl's performance vis-à-vis progressivism was inevitably not good enough despite their obvious successes. Mixed ability teaching in secondary sector was framed within the discourse of comprehensive education and the reduction of the social class differentials. Scant attention was paid to, therefore to, pupil behavior in mid sex classrooms which negatively affected girls performance (Kelly, 1973).

Both genders suffer, but women in the most obvious and persuasive ways. The reason for the suffering is that the society teaches that there are genetic differences in aptitude that are related to gender and to the proper roles for each gender. For example, our culture deems men to be better at mathematical things aptitude but to

be less able in literally matters, and women to have less mathematical aptitude but to be better at empathy and nurturing (Sadker, 1994).

Thus it is with mathematics, science and women but the problem is even sinister because the achievement gap between the genders in mathematics and science is not nearly as great as is the situation with respect to reading and writing, but the myth persists in terms of self-esteem and opportunities provided. The study of women entering the University of California at Berkley, all have been high achievers in general in order to be admitted. In the year of study, though 57% of the males admitted had taken four years of mathematics, only 8% of the females had. Without the four years of mathematics courses, students are not eligible for the calculus sequence, would rarely attempt chemistry or physics and are disadvantaged for statistics and economics (Tobias, 1993).

The academic opportunity discrimination persists. The old notion that girls who were achievers would make poor dates probably has diminished somewhat but the idea of femininity and academic excellence can go together is not well established and many females are still taught that academic learning is not as important as being good looking and charming (Myra, 1994).

For males, too, gender stereotypes cause great damage academically. Differential treatment at an early age can have devastating effects. Between kindergarten and third grade boys are about three times as likely to be retained in grade (held back an year) as girls. Retention at that age increases the likelihood of dropping out

of school, about 75% compared with students of equal achievement who were promoted. The same proportional difference exists with respect to retention between grades four and six, where the effect is to increase the dropout rate by about 90% (Gray, 1993).

With respect to the basic education, schools offer, gender differences in academic aptitude if they exist, need have no effect. There are no gender differences sufficient to prevent boys and girls from having equal degrees of excellence in all the areas within the general curriculum. In an excellent educational system (or classroom), everybody wins. Good education is the key. But the school has to lead on this one (Friedman, 1995).

In the mid 1970's, data collection on individual and school culture was less systematic and less pervasive than today. Any evidence of gender difference tended, therefore to be piecemeal and fragmented. However it was possible to identify various more or less consistent patterns of gender difference of the period. Variations in achievements (girls being better at reading and boys having more advanced mathematical problem solving skills and better spatial awareness) were held to derive from biology and were therefore viewed as natural (Walkerdine, 1983).

In examinations of the 1970's, girls tended to do as well as boys up to O-level (except in mathematics and science), but after this boys had the advantage both in the numbers that stayed on at school and the number of subjects taken at A-level. From CSE upwards there were fewer subject entries for girls than for boys (by about 15%) and A-

level, subject entries for boys exceeded girls by about 10,000. this is relatively lower participation of girls in examinations was reflected in their relatively lower performance in them (Rendel, 1974).

Significance of the Study

This study will benefit the following disciplines:

Ministry of Education will be able to come up with ways to improve performance of the chemistry subject.

Principals of School will try and equip school laboratories with equipment for chemistry practical.

Pupils will improve in their performance in chemistry subject.

Parents will encourage their girls to enroll in Chemistry classes and to also improve their performance.

Future Researchers will have a basis for further research on performance of girls in the science subjects.

Objectives

General: This study determined the academic performance of students in chemistry subject of Jamhuri High School in Nairobi District, Kenya.

Specific: this study sought to

1. determine the profile of the respondents as to:

1.1 socio - demographic data

1.1.1 age

1.1.2 gender

1.1.3 class

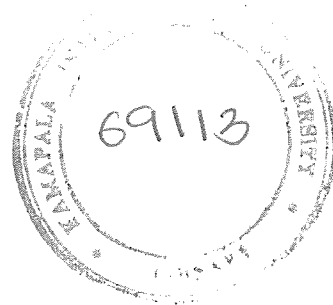
2. determine the level of academic performance in the chemistry

subject.

3. determine if there is a significant difference in the level of academic performance between male and female students.

Statement of the Null Hypothesis (H_0)

There is no significant difference in the level of academic performance between male and female students.



RESEARCH METHODOLOGY

Design

This study utilized the descriptive survey method to determine the academic performance of students in chemistry subject of Jamhuri High School in Nairobi District, Kenya.

Environment

This study was conducted at Jamhuri High School in Nairobi city, Kenya. The school offers the 8-4-4 system of education. The school offered a variety of subjects which are Biology, Chemistry, History, C.R.E, Physics, Computer studies, Geography and Mathematics.

Subjects

This study involved 82 students in the fourth year in high school namely: 40 from 4 West students and 42 from 4 East students.

Instrument

This study was a researcher devised instrument which was a record sheet which sought to determine the profile of the respondents as to age, gender, class and level of academic performance in chemistry subject.

Data Collection Procedures

The researcher sent a transmittal letter to the principal of Jamhuri High School requesting for permission to obtain data from students of class 4 East and 4 West. The researcher went ahead to calculate the frequency and percentage to determine the profile of the respondents as to age, gender, class and level of academic performance in chemistry subject. The paired or related t-test was used

to test for significant difference in the level of academic performance between male and female students.

Statistical Treatment of Data

The frequencies and percentages were used to describe the profile of students in terms of age, gender, class and level of academic performance.

Formula:

$$f/n \times 100$$

where: f = frequency
 n = total number
 100 = constant

The paired or related t-test was used to test for significant difference in the level of academic performance between male and female students.

Formula:

$$t = \frac{\bar{d} - d_0}{sd / \sqrt{n}}$$

where: t = computed value of the t – test statistic
 \bar{d} = mean difference
 d_0 = assumed difference
 sd = standard deviation of the differences
 n = total number of responses

DEFINITION OF TERMS

For the purpose of the study, the following terms are defined operationally:

Chemistry Subject refers to one of the units done in fourth year high school.

Level of Academic Performance refers to the marks obtained in first term by the 4th years in chemistry subject.

Profile indicates the important information as to age, gender and class of the students.

RESULTS AND DISCUSSION

This study presents and discusses the profile of the students as to age, gender, class; level of academic performance; and significant difference in the level of academic performance between male and female students.

Profile of Students

A total of eighty two students were included in this study where fifty four were male and twenty eight were female. The ages were categorized into three: twenty years old and above, eighteen years old to nineteen years old, and seventeen years old and below.

Eight or nine percent were twenty years old and above, forty eight or fifty nine percent were eighteen years old to nineteen years old, and twenty six or thirty two were seventeen years old and below. It gives the implication that the majority of the students were at the exact age of being fourth year because the mean of their ages was 17.93.

The classes were categorized into two: four east were forty two students or fifty one percent and four west were forty or forty nine percent. It implies that majority of students were in four east class.

Table 1
Profile of Students

Category	Frequency	Percentage (%)
Age		
20 – above	8	9

18 – 19	48	59
17 - below	26	32
Total	82	100
Gender		
Male	54	66
Female	28	34
Total	82	100
Class		
4 East	42	51
4 West	40	49
Total	82	100

Level of Academic Performance

Table 2 shows the level of academic performance of student's first term stage exam in chemistry subject, the students had failing marks while thirteen or sixteen percent belonged to fairly good category. This implies that the majority of the students had fairly good in chemistry subject and the mean average was 51 (fairly good).

Table 2

Level of Academic Performance

Category		Frequency	Percentage (%)
81 – 100	excellent	4	5
71 – 80	very good	12	15
61 – 70	good	12	15

51 – 60	fairly good	13	16
41 – 50	fair	11	13
31 – 40	average	10	12
21 – 30	below average	10	12
0 – 20	poor	10	12
Total		82	100

Significant Difference in the Level of Academic Performance Between Male and Female Students

Table 3 shows that there is a significant difference in the level of academic performance between male and female students, as shown by the computed t-value which was greater than the critical t-value.

Table 3

Significant Difference in the Level of Academic Performance Between Male and Female Students

Area	Critical t - value	Computed t - value	Decision on H₀	Interpretation
Male and Female	1.990	4.719	Reject H ₀	Significant

CONCLUSION

Based on the findings, it can be concluded that the academic performance of students in chemistry subject are rated as fairly good. However, it needs to be improved.

RECOMMENDATIONS

Based on the findings of the study, the following are recommended:

1. More girls should be enrolled for the chemistry subject in schools. This can be done by sensitizing the girls on the need for science subjects by ministry of education, parents and teachers.
2. The girls should also be counseled in order to change the attitude that chemistry is a difficult subject. This can be done by ministry of education to schools.
3. School principals should ensure that chemistry laboratories are well equipped with appropriate and chemicals.
4. Chemistry teachers should be given low work load (lessons) to enable them to teach the subject effectively.
5. The parents should also enroll more girls in school so that the enrollment in the chemistry subject increases.
6. The government of Kenya should build and equip chemistry laboratories for small schools which are not able to do so.
7. Further research be conducted to come up with ways for improving the performance of females in chemistry subjects.
8. Areas for further research:
 - a. Causes of low academic performance of females in chemistry subjects.
 - b. Ways to improve academic performance and enrollment of girls in chemistry subject.

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APPENDIX A**TRANSMITTAL LETTER FOR THE PRINCIPAL OF JAMHURI
HIGH SCHOOL**

May 5, 2007

The Principal,
Jamhuri High School,
P.O Box 12430, Nairobi, Kenya

Dear Sir,

I am an in-service student-teacher at Kampala International University. I am carrying out a research on gender and academic performance in Chemistry subject. This research is to be submitted to the faculty of education as a partial fulfillment for the award of a degree in science education.

I am writing to request you to allow me obtain data from students in the fourth form of your school, which will enable me to complete my research paper.

Respectively yours,

GRACE NUNGARI KUNG'U

Noted by:

CYBELLE A GONZALES, BSSED, MATS
Adviser

GEOFFREY KASOZI, BCOM, ACCA
Assistant Director, Academics, ICDS

APPENDIX C

PLAN FOR DATA PRESENTATION

Table 1

Profile of Students

Category	Frequency	Percentage (%)
Age		
20 – above		
18 – 19		
17 - below		
Total		
Gender		
Male		
Female		
Total		
Class		
4 East		
4 West		
Total		

Table 2
Level of Academic Performance

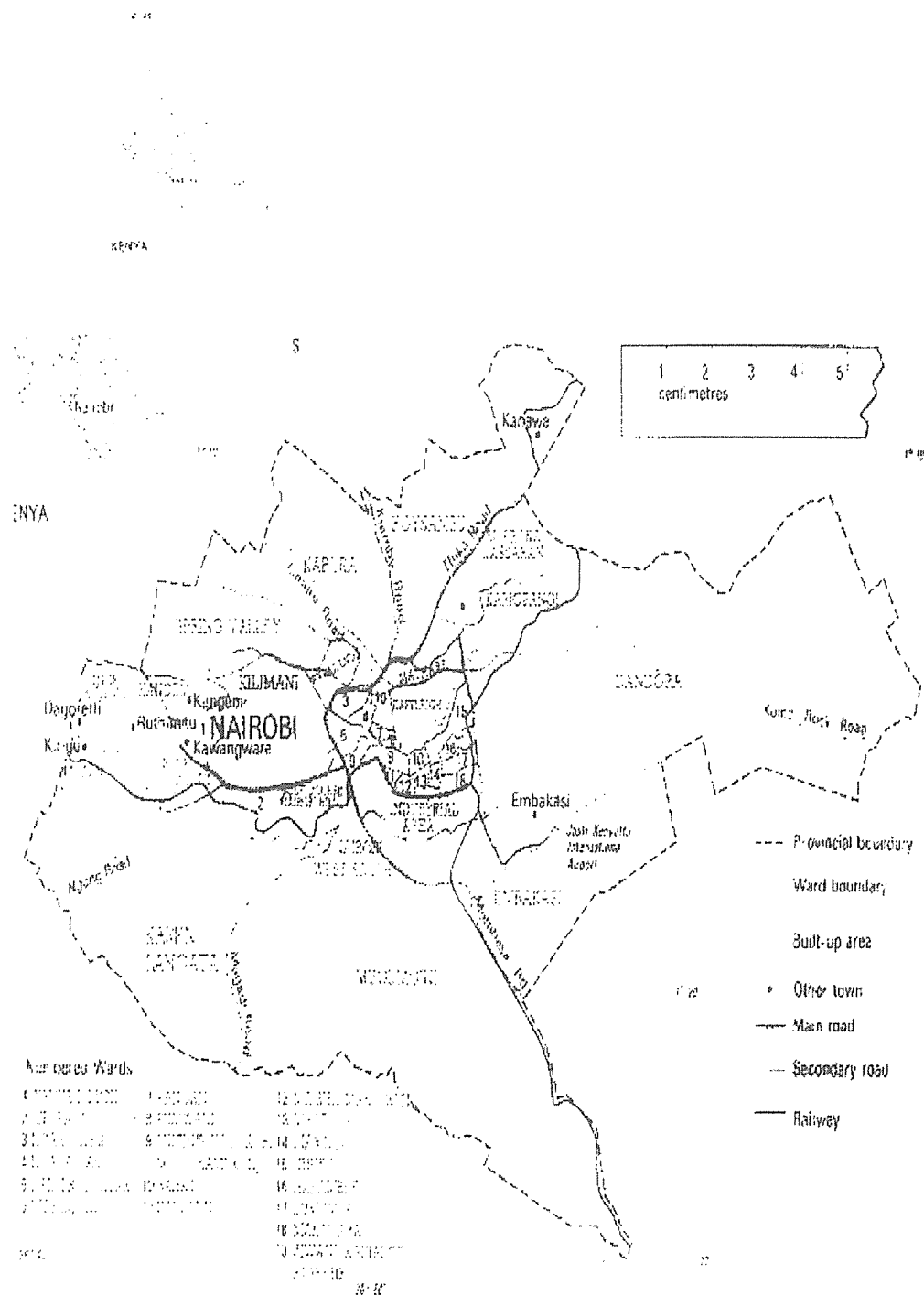
Category		Frequency	Percentage (%)
81 – 100	excellent		
71 – 80	very good		
61 – 70	good		
51 – 60	fairly good		
41 – 50	fair		
31 – 40	average		
21 – 30	below average		
0 – 20	poor		
Total			

Table 3
Significant Difference in the Level of Academic Performance
between Male and Female Students

Area	Critical t - value	Computed t - value	Decision on H ₀	Interpretation
Male and Female				

APPENDIX D

MAP OF RESEARCH ENVIRONMENT



CURRICULUM VITAE

Personal Background

NAME : Grace Nungari Kung'u
 REG. NO : BED/7030/51/DF
 AGE : 34 years
 GENDER : Female
 CIVIL STATUS : Married
 ADDRESS : 23071 Lower Kabete
 DATE OF BIRTH : June 12, 1972

Educational Background

COLLEGE : Kampala International University
 Bachelor of Education in Science
 2005 - 2007
 : Kenya Science Teacher's College
 Diploma in Education
 1993 - 1995
 SECONDARY : Leshau Secondary School
 1988 - 1991
 ELEMENTARY : Gituamba Primary School
 1980 - 1997

Research Experience

Bachelor of Education in Science

"ACADEMIC PERFORMANCE OF STUDENTS IN CHEMISTRY SUBJECT OF
 JAMHURI HIGH SCHOOL IN NAIROBI CITY, KENYA"

