THE PREDICTIVE VALIDITY OF KCSE FIRST ATTEMPT GRADE ONUNIVERSITY ENTRY GRADE: A STUDY OF KCSE REPEAT TAKERS IN NAKURU COUNTY.

JAMES ONKOBA

B.ED., EGERTON UNIVERSITY, 1997

M.ED., EGERTON UNIVERSITY, 2006

I56/CE/23343/2010

ABSTRACT

Most past studies have focused on the predictive validity of high school GPA on academic performance of students in universities and colleges. Little attention has been given to predictive validity of repeat takers' first attempt grade on university entry grade. This study investigatedthe relationship between the repeat takers' first attempt grade and university entry grade attained in a National examination. The purpose of this study was to establish the predictive validity of first attempt grade on second attempt grade of the repeat takers.Correlation and ex-post facto research designs were employed. Simple and systematic random sampling methods were used to select participating districts, schools and students.Simple regression, logistic regression and discriminant analysis were used to determine the dominant independent variables. A significant linear relationship between the repeat takers' second attempt grade and first attempt grade was established.Logistic regression analysis showed that repeat takers who had minimum university entry grade in their first attempt had more chances of attaining an automatic university entry grade in their second attempt than those with below minimum university entry grade in their first attempt.Discriminant analysis results found out that first attempt grade distinguished more between the repeat takers who scored automatic university entry grade from those who scored university entry grade than type of school with correlation of 0.895 and 0.201 respectively. The results of study provide significant information for decision makers in education on model that may be applied to predict future admissibility of repeat takers to Kenya public universities.

Key words: repeat takers, discriminant analysis, logistic regression

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

University education is on high demand among students in Kenya. The number of students pursuing higher education in universities has grown from 70,095in the 2004/2005 academic year to 134,395in the 2010/2011 academic year which is a 91.7% increase(KNBS, 2011). Many students from middle income and poor families are however not able to afford university education as self-sponsored students. The joint admission board (JAB) has steadily increased the cutoff point of seven points out of 12 to thecurrent 9 points out of 12. This has significantly locked out students with the minimum university entry qualifications due to high tuition fees for parallel university programmes**.** Automatic University entry phenomenon has caused so many candidates who do not attain the AUE grade to re-take the exam for the second and third attempts in order to meet the cut-off points to secure the JAB selection. The limiting of the number of times one can repeat to three has affected the dreams of many to pursue their preferred courses in a Public University

through a government sponsored programme. In the United States, students who re-take the Scholastic Aptitude Test in hopes of improving their college standings with college admissions offices are likely to fulfill their dreams owing to two factors(Mueser, 2007). First is the widespread policy by college admission offices to use only the highest score. The second reason why re-taking the SAT often pays off is the actual tendency for test-takers to score higher when they re-take the test

Student selection for university courses in Kenya is an activity that is performed by the Joint Admissions Board (JAB) each year. In this process students are allocated courses of their choice according to their performance in specific subjects. Minimum requirements exist for each course and only students having the prescribed grades in specific subjects are eligible to join a particular course. This activity may be costly and prone to bias, errors, or favor, leading to disadvantaging some students.

Admission requirements for these universities are dynamic and keep fluctuating each year de-pending on the overall performance of students. Course requirements have to be revised every year in order to scale the number of student admissions according to limited university slots. This activity can be tedious, time consuming and calls for systems that are also dynamically changing to manage the task. The approach is also subject to abuse by insiders within JAB and inappropriate-ate use of resources.

As a result of the current system, students have been assigned to courses they did not apply for. They later find the courses that were assigned to them beyond their scope, get overwhelmed, and keep on re-sitting for exams ("Joint Board Should Review," 2009). This may result in many opting to forgo those courses in favour of courses they preferred in the private universities both in Kenya and abroad or self-sponsored programmes in Kenyan public universities for those who have finances. The poor, who cannot afford financing self-sponsored university education, will therefore just lose out. It is estimated that only 20% of the qualified students eventually get ad-mitted into local universities every year (Munavu, Ogutu, & Wasanga, 2008). The selection process for university admission has denied many capable students a chance in a public university.

Public universities (in Kenya) and their constituent colleges conduct a joint admission exercise to their universities under a common framework called the Joint Admission Board (JAB). This is mainly to ensure that access to university education is based on academic merit for institutional-based undergraduate students (This excludes students who are admitted to distance education / self-sponsored programmes). Students admitted through the board get funding from the government. This admission exercise is performed annually before the start of each academic year for candidates who have sat the Kenya Certificate of Secondary Education (KCSE) examination the previous year.

During the admission process, priority is given to an applicant's first choice. The applicant's second to fourth choices are considered where vacancies still exist (Joint Admissions Board, 2009). JAB makes the choice for a student in cases where vacancies which exist do not match with the student's choice. However, due to limited capacity in popular programs, some qualifying students with the required cut–off points end up in courses that might not have been their preferred choices (Munavu et al., 2008).

1.2 Statement of the problem

Existing literature has paid very little attention to test-retaking and its contribution on improving chances for college admission. A study done on the effect of a State Merit Scholarship on test re-taking, enrollment in the United State of Missouri established that the highest mean gain, which occurs between the first and the second attempt, is less than one point. In fact, no test taker with an ACT score below 22 had ever been able to qualify for the scholarship, regardless of how often the test was retaken. Only people with an initial score very close to 30 had a reasonable chance of achieving 30 upon retaking the test(Vidgor and Clotfelter, 2003). In this study, score improvement, predicted to occur upon retaking the exam which was used as a

predictor of university entry was establishedand showed the predictive validity of first attempt grade on university entry grade by repeat takers.

1.3 Research Objectives

(i) To establish the relationship between the repeat takers'' first attempt grade' and the grade attained in the second attempt.

(ii) To determine the relationship between automatic university entry grade attained by repeat takers in the second attempt and thefirst attempt grade

(iii)To determine whether age, sex, and type of school attended by test re-takers influencethe predictive validity of 'first attempt grade' on university entry grade

1.4 Research Questions

(i) What is the relationship between repeat takers' 'first attempt grade' and the second attempt grade attained in KCSE?

(ii) What is the relationship between automatic universityentry grade attained by repeat takers in the second attempt and the first attempt grade?

(iii)How do age, sex,and type of school attended by repeat-takersaffect the predictive validity of repeat takers' 'first attempt grade' on university entry grade?

1.5 Hypotheses

i) H_0: There is a statistically significant relationship between repeat takers' 'first attempt grade'and the grade attained in the second attempt.

H_1: There is no statistically significant relationship between repeat takers' 'first attempt grade'and the grade attained in the second attempt.

ii) H_0: Automatic University entry grade attained by repeat takers in their second attempt is independent of repeat takers' minimum University first attempt grade.

H_1: Automatic University entry grade attained by repeat takers in their second attempt is dependent of repeat takers' minimum University first attempt grade.

iii) H_0 : University entry grade attained in the second attemptis independent of age, sex, and type of schoolattended by repeat takers.

H_1: University entry grade is dependent of age, sex location of school and type of school attended by repeat takers

1.6 Significance of the Study

The expected findings on the relationship between repeat taker's first attempt grade and the attainment of university entry grade in the second attempt will enable the parents and teachers to make informed decision and offer proper guidance to their children who wish to re-take the exam again.

The study findings may contribute to the body of knowledge that. It envisaged that the findings of study may enable professionals in guidance and counselling and other stakeholders concerned with students in designing intervention strategies to enable the students who wish to re-take their exams for a second or third time to make informed decision and explore alternative career paths.

1.7 Scope of the Study

The study examined the relationship between repeat takers' first attempt grade and university entry grade attained in the second attempt. The study focused on those repeat takers who had attempted the KCSE exam for the second time only and attained university minimum entry grade and above. The study was carried out in Nakuru County.

1.8 Study assumption

The studywas based on the following assumptions

(i) The repeaters 'scores will not contain any learning effects from other forms of repetition other than that of exam re-taking.

(ii) That the examination system is in steady state.

(iii) That exam is constant in terms of content and difficulty over time and

(iv) All students who want to access higher education have to take the common exam.

1.9 Limitation of the study

i) Other variables such the years taken by the repeat takers to learn before taking a second test, social economic status and personal factors such as intelligence, motivation, attitude could have confounding effects on the association between the independent variables (repeat takers' first attempt grade) and dependent variable (University entry grade attained in the second attempt). A similar study may be replicated to establish their effects.

ii) This study involvedrepeat takers who attain minimum university entry grade and above, but not those whose second attempt shows grade improvement despite not attaining the required university entry grade. This limits the generalization of the findings. Similar study to be done that will focus on learning gains with each subsequent exam re-taking.

iii) The conclusions was based on a sample drawn from Nakuru County secondary schools this limited the generalizations of the study findings. A similar study may be replicated in other Counties.

1.10 Operational Definition of Key Terms

The following are the central terms that were used in the study.

Academic performance: a reference to how well a student performs in academic knowledge and skills which is reflected by that student's cumulative grade point average (GPA).

Automatic university entry grade: The grade as determined by the Joint Admission Board (JAB) and that varies on yearly basis depending on overall student performance

Below minimum university entry grade:any grade below the minimum university entry grade that is C-plus (C+)

Correlation coefficient: a statistical index of the linear relationship between two variables or measures. Coefficients range from –1.00 to +1.00 with values near zero indicating no relationship and values far from zero indicating a strong relationship; positive correlations mean that high values on both variables occur jointly while negative correlations mean an inverse relationship exists between the variables. In test validity studies, correlation coefficients between a predictor and a criterion are often called validity coefficients

Criterion: a response or dependent variable or test score. In this study the criterion used are the minimum University entry grade and automatic University entry grade.

College Entrance Test: a test used to assess the student's readiness for admission into a graduate institution.

Differential prediction: refers to a situation where the best prediction equations and/or the standard errors of estimate are significantly different for different groups of examinees.

Differential validity: refers to a situation where the computed validity coefficients are significantly different for different groups of examinees. In this study the different groups will be categorized in terms of age, gender, type of school and location of school.

Minimum university entry grade. The lowest grade acceptable by Universities in the admission of students for various courses. In this study, the C plus (C+) grade

Prediction equation: the resulting equation obtained from a linear regression analysis with a single criterion and one or more predictors computed from a sample of students.

Predictive validity: one of the aspects of test validity as originally defined by the American Psychological Association. It is most commonly used to describe the relationship between a predictor such as a test score and a criterion such as a grade point average.

Predictor: an independent variable used to forecast a criterion variable. In predictive validity studies, the most commonly used predictors are one or more test scores and high school grade point average. Typically, the predictor scores are temporally available before the criterion scores.

Repeat takers: Students who take the university entry exam more than once. In this study, repeat takers refer to those students who re-take the KCSE exam for a second time.

University entry grade: any grade starting from minimum university entry grade and less than automatic university grade.

CHAPTER TWO
LITERATURE REVIEW
2.1 Prediction of future academic success
Prediction of future academic success falls within the realm of predictive validity evidence. Predictive validity evidence indicates how well an assessment can predict scores obtained at a later time through the use of either the same measure or a different measure. In the *Standards for Educational and Psychological Testing*, predictive validity is defined as "how accurately test data can predict criterion scores that are obtained at a later time" (American Educational Research Association, American Psychological Association & National Council on Measurement in Education, 2006, p. 180). Predictive validity comes into play when a test is used to predict the likelihood of some future performance. It indicates the extent to which an individual's future level on the criterion is predicted from prior test performance. Literature shows that research on future academic success has discussed two types of predictor variables, namely cognitive and no cognitive predictors. Cognitive predictors refer to the standardized entrance tests such as the SAT and ACT tests and achievement measures such as high school GPA and high school rank-in-class. Non cognitive predictors refer to two main attributes: personality characteristics, such as self-motivation, self-directedness, dedication to studies, and social skills; and environment factors, such as size of schools, location of schools, parental education, and socioeconomic status (Ganley, & McKenzie, 2002; Barnett, Ritter, & Lucas, 2003). Much research has been conducted to determine which would be more accurate predictors of future academic success in postsecondary institutions. Some researchers favor cognitive predictors (Kuncel, Credé, & Thomas, 2007), whereas others lean toward using no cognitivevariables and claim that they are important for the prediction of students' academic success (Sedlacek, 2004). Micceri (2001) indicated that cognitive predictors like high school GPA and standardized test scores are the best predictors with variables such as race, ethnicity, and gender providing some additional information. Alderman (2007) also showed that high school GPA is a better predictor of future academic success than other factors such as the demographic variables of race, gender, or socioeconomic status.

2.2 Kenya's education system and challenges
Since independence, many African education systems have faced pressures for expansion, and Kenya is no different, as it continues to see numerous challenges since its 1963 independence from British colonization. Prevalent issues across Africa result from the increased demand for educational access, decreased governmental funding combined with increased costs, and the mismanagement of university and governmental resources (Ngome, 2003; Teffera & Altbach, 2003). As a developing country, Kenya struggles with access issues to its education system beginning with universal primary schools, then a selective and hierarchical secondary system, and finally, with a young public higher education system. In just over 40 years, Kenya's higher education system has grown from one British originated university, the University of

Nairobi, to seven public universities. Since it is such a young system, it can only accommodate approximately three percent of the university aged population (Otieno, Kiamba, & Some, 2008). For the 2011 academic year, more than 60,000 academically qualified students were unable to attend university due to space limitations and the government's inability to cover their costs ("Thousands to miss places in varsities," 2010)

2.3 Transition to Tertiary

The education system in Kenya does not provide true universal access to the primary and secondary levels to help students eventually reach higher education. If these students are unable to reach secondary school, then moving up the education ladder to university is even more inaccessible due to the limited availability of university spots and the high costs due to cost sharing. Only a small percentage of students are able to attend the most prestigious and college preparatory secondary schools so an even smaller group is eligible for university. Between 2004 and 2009, only 24 percent of the Kenya Certificate of Secondary Education (KCSE) exam takers had obtained a high enough grade, C+, to be considered for university admissions (Siringi & Ndurya, 2009). To further demonstrate the severity of competition and the difficulty of access, in 2001, administrators at Egerton University expelled 90 students after discovering these students gained admissions with fraudulent secondary school exams and transcripts (Kigotho, 2001).

2.4 Access to Higher Education

Historically, it is important to note that after independence, Kenyan higher education was free as the government desired to train a truly Kenyan workforce to replace the departing British administrators and the government wanted to improve access (Wangenge-Ouma, 2008). The free higher education program lasted until 1974 when the government introduced a student loan "scheme" or program created to help cover non-tuition costs. This program was unsuccessful partially because the government had not developed a repayment process so the default rate was 81 percent by 1987 (Otieno, 2004).

Since independence, the government has established six additional public universities. All seven Kenyan public universities have experienced rapid growth and expansion with the governmental goals to improve equity, the economy, and the educated populace (Jowi, 2009; Otieno, Kiamba, & Some, 2008). Each year the Joint Admissions Board (JAB) determines the number of student seats and the cutoff grade point.

2.5 University admission in Kenya

Student selection for university courses in Kenya is an activity that is performed by the Joint Admissions Board (JAB) each year. In this process students are allocated courses of their choice according to their performance in specific subjects. Minimum requirements exist for each course and only students having the prescribed grades in specific subjects are eligible to join a particular course. This activity may be costly and prone to bias, errors, or favor, leading to disadvantaging some students. Admission requirements for these universities are dynamic and keep fluctuating each year de-pending on the overall performance of students. Course requirements have to be revised every year in order to scale the number of student admissions according to limited university slots. This activity can be tedious, time consuming and calls for systems that are also dynamically changing to manage the task. The approach is also subject to abuse by insiders within JAB and inappropriate-ate use of resources.

As a result of the current system students have been assigned to courses they did not apply for. They later find the courses that were assigned to them beyond their scope, get overwhelmed, and keep on re-sitting for exams ("Joint Board Should Review," 2009). This may result in many opting to forgo those courses in favour of courses they preferred in the private universities both in Kenya and abroad or self-sponsored programmes in Kenyan public universities for those who have finances. The poor, who cannot afford

financing self-sponsored university education, will therefore just lose out. It is estimated that only 20% of the qualified students eventually get ad-mitted into local universities every year (Munavu, Ogutu, & Wasanga, 2008). The selection process for university admission has denied many capable students a chance in a public university. Public universities (in Kenya) and their constituent colleges conduct a joint admission exercise to their universities under a common framework called the Joint Admission Board (JAB). This is mainly to ensure that access to university education is based on academic merit for institutional-based undergraduate students (This excludes students who are admitted to distance education / self-sponsored programmes). Students admitted through the board get funding from the government. This admission exercise is performed annually before the start of each academic year for candidates who have sat the Kenya Certificate of Secondary Education (KCSE) examination the previous year. During the admission process, priority is given to an applicant's first choice. The applicant's second to fourth choices are considered where vacancies still exist (Joint Admissions Board, 2009). JAB makes the choice for a student in cases where vacancies which exist do not match with the student's choice. However, due to limited capacity in popular programs, some qualifying students with the required cut–off points end up in courses that might not have been their preferred choices (Munavu et al., 2008).

Institution	2003		2004		2005		2006		2007	
Male	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
NAIROBI	16,992	9,720	21,268	11,706	21,940	11,706	22,513	12,426	23,513	12,826
Full time	9,603	4,406	9,987	5,250	10,800	5,250	10,858	5,536	11,340	5,714
Part Time	7,389	5,314	11,281	6,456	11,140	6,456	11,655	6,890	12,173	7,112
KENYATTA	10,735	5,023	11,252	4,803	10,896	4,803	8,845	7,891	10,172	8,425
Full time	5,221	3,495	4,313	2,887	4,356	2,887	5,066	3,285	5,826	3,507
Part Time	5,532	1,528	6,939	1,916	6,540	1,916	3,779	4,606	4,346	4,918
MOI	5,804	4,634	6,796	5,214	6,831	5,214	8,604	6,059	8,674	6,158
Full time	4,107	3,211	4,304	3,195	4,311	3,195	5,654	3,554	5,700	3,612
Part Time	1,697	1,432	2,492	2,019	2,520	2,019	2,950	2,505	2,974	2,546
EGERTON	6,908	2,444	6,350	2,247	6,262	2,247	8,163	4,006	8,262	4,205
Full time	6,207	2,196	5,540	1,960	5,322	1,960	7,319	3,383	7,408	3,551
Part Time	701	248	810	287	940	287	844	623	5,450	654
(JKUAT)	3,202	1,455	4,315	1,959	4,207	1,959	4,460	1,845	2,659	2,512
Full time	1,373	624	2,201	999	2,240	999	2,176	524	2,791	713
Part time	1,829	831	2,114	960	1,967		2,284	1,321	3,487	1,799
MASENO	3,428	2,179	3,413	2,168	2,826		2,778	1,937	2,370	2,199
Full time	2,777	1,765		1,690	2,106		1,888	1,277	1,117	1,450
Part time	651	414		478	720		890	660	946	749
Special	-	-			775		1,154	656	508	278
MASINDE MULIRO	-	-			420		620	422	438	179
Full time	-	-			355		234		60,504	99
Part time		-			-				-	
Totals	**47,087**	**25,464**	**53,394**	**28,097**	**53,737**	**27,940**	**56,517**	**34,820**	**60,504**	**36,603**

Table 1: Enrollment in Kenyan Public Universities by Gender between 2003-2007 (Source: Republic of Kenya, (2008) Economic Survey)

The statistics of Table 1 show marked differences of enrollment of males and females in all public Universities. Total enrolment in the universities grew by 5.4 per cent from 112,229 students in 2006/07 academic year to 118,239 students in 2007/ 08 academic year. Students' enrolment in public universities rose by 6.3 per cent from 91,337 students in 2006/07 academic year to 97,107 students in 2007/08 academic year, with Nairobi University, the oldest and largest, constituting 26.3 per cent. Male student enrolment increased by 7.1 per cent from 56,517 to 60,504 while female enrolment went up by 5.1 per cent from 34,820 to 36,603 during the same period.

The proportion of female students enrolled in the universities was 40.1 per cent of the enrolment in 2007/08 compared to 39.1 per cent in 2006/07 academic year. In all the public universities, male's enrollment surpasses that of females almost by half.

2.6 Factors that may affect predictive relationships

Several factors may influence predictor-criterion relationship. The factors include psychometric characteristics of examinations, characteristics of examinee, and characteristics of schools.

2.6.1 Characteristics of examinations

Questions on the adequacy of an examination as a measure of the characteristic it is to assess are answerable on scientific grounds by appraising psychometric evidence (messick, 2004). Since all the psychological measurements are subject to error it is rare to set a perfectly reliable examination. An examination is said to be reliable if results of the individual could be replicated upon writing the same examination again under similar conditions. In an attempt to determine the degree of relationship between a predictor and criterion, it is important that errors of measurement be minimized

2.6.2 Characteristics of examinee

Examinee characteristics may influence the predictor-criterion relationship in a validity study. The selected examinee characteristics are age, and gender. The relationship between age and achievement is more complex by the fact that grade retention, maturation learning and nature of instructions are confounding variables in the relationship. Walsh (2000) found that children who were youngest in their class showed the highest chances of failure.

There is a substantial body of evidence to suggest that from the beginning of secondary schooling, males frequently outperform females in science and mathematics subjects (Fennema& Leder, 2003).

2.6.3 School characteristics

School characteristics may affect predictive relationships. Such characteristics are, in general, called school climate. School climate is a summary concept dealing with the total environmental quality within a school system. These may be location of the school, quality of teachers and curriculum organization. Anderson (2009) found that each school has a unique climate, and that climate affects many students' outcomes.

CHAPTER THREE
RESEARCH METHODOLOGY
3.1 Study Design

Correlation and ex-post facto designs were employed to investigate the relationship that exists between the First attempt repeaters' grade (predictor variables) and University entry grade (criterion variable). The latter design was used because both the cause and the effect had already occurred and the data involved in the study was the same as the one at the source without any manipulation.

3.2 Location of the Study

The study focused on randomly selected districts of Nakuru County of Kenya. The County was purposively chosen as it was convenient to the researcher. Nakuru County is made of four districts namely Molo, Nakuru North, Naivasha, and Nakuru (Kenya open data, 2013).

3.3Population

The population for this study comprised of all schools within the Nakuru County that had repeat takers in the 2011 KCSE examination. Repeat takers who graduated from the Kenyan secondary schools as at December 2011 and who attaineda minimum university entry grade and above was sampled from the selected schools. There are 172 public secondary schools in Nakuru County (Soft Kenya, 2013)

3.4 Sampling design and sample size

The sample sizes for 2 districts and 120 schools were determined by formula recommended by Taro Yamane's formula (Yamane, 1973)under the assumption that simple random sampling is the sampling design.

$$n = \frac{N}{1 + Ne^2}$$

Where 'n' is the required sample size, 'N' is the total population, 'e' is the margin error (0.05) (Yamane, 2000).

Simple and systematic random sampling methods were used to select participating districts, schools and students. The schools that had repeat takers from each district were picked randomly using systematic random sampling. Repeat takers from each sampled school were selected purposively subject to attainment of University entry grade.

3.5Instrument and Validation

A researcher-designed format for data collection wasdeveloped. This instrumenttookcognizance of students' academic records and demographic information. The first draft of the instrument was subjected to University supervisor and therecommended amendments were duly effected. The revised draft of the instrument was then piloted in ten secondary schools which were excluded in the main study. The data from the pilot study was analyzed and its results used to mend the instrument accordingly. With these amendments, the instrument was considered suitable and ready for data collection.

3.9 Data Collection

Data were collected from the sampled secondary schools with the help of field Research Assistants. The data was collected on the basis of the subgroups in the study. The subgroups were male and female repeat takers who attaineda minimum University entry grade and above. The KCSE grade attained was converted into a composite score. The repeat takers' composite score was a sum of the grade points of seven best relevant subjects. Thus the minimum composite score that was attained by the repeat takers was 49 and the maximum 84

3.7 Data Analysis

Data was abstractedly coded and entered into the computer by a group of two data entry clerks and reviewed by an IT Consultant, engaged for the purpose, of logic and accuracy. Data was analyzed using the Pearson Product Moment correlation coefficient and inclusion in linear regression analyses (Cohen and Cohen, 1983) logistic regression analysisand discriminant analysis. All analyses was done using SPSS version 17 for windows. Independent sample two-sided t-tests werecomputed for continuous variables as well as analysis of variance (ANOVA) were performed to test the adequacy of the postulated models. The level of significance was set at 0.05 for all statistical tests. The prediction model was determined by fitting the values of the relevant parameters in the general linear regression model:

$$Y = a + bx$$

The predictor variables in the regression analysis was the repeat takers' first attempt grade point score.For the logistics regression analyses, the procedure allows for independent variables to predict a dichotomous

outcome. In this study the criterion variables (attainment of university entry grade) is dichotomous (whether a student attains an automatic university grade or minimum university entry grade for the second attempt) and the predictor variable is repeat takers' first attempt grade. Logistics regression analysis uses the maximum likelihood estimation rather than the least-squares estimation to obtain the estimates of the model parameters. The logistic regression models the relationship between predictor variables and criterion variable through the logit function. The following equation represents the logit equation for the attainment of university entry grade model in the current investigation (Young, 2001)

$$\log\left(\frac{p}{1-p}\right) = a + bx + e$$

Where $\log\left(\frac{p}{1-p}\right)$ is the natural log of the odds ratio and the odds ratio equals to the probability of attaining automatic university entry grade divided by the probability of attaining minimum university entry grade:

$$\text{odds ratio for attaining university grade } = \frac{p(\text{attaining automatic university entry grade})}{p(\text{attaining minimum university entry grade})}$$

If the variable is significant, then the logit coefficient suggests a significant increase or decrease in the odds ratio. The probability that a repeat taker attains automatic university entry grade in the second attempt equals the following equation.

$$p(\text{attaining automatic university entry grade}) = \frac{\text{odds ratio}}{1 + \text{odds ratio}}$$

The effectiveness of logistic regression models was examined by using the likelihood ratio test. This test examines if the logistic model is more effective than the null model, the intercept-only model. The statistical significance of individual regression coefficients (i.e., B_i's) were tested using the Wald chi-square statistic(Kuncel, 2007).

CHAPTER FOUR
RESULTS AND DISCUSSION
4.1 Introduction
This chapter will provide the presentation, analysis and interpretation of all the data collected from the area of study during the research period. Data was collected through a researcher designed format for data collection.

The quantitative data was analyzed using both descriptive and inferential statistics and was presented in the form of tables. Results of the data analysis provided information that formed the basis for discussion, conclusion, and interpretation of the findings and recommendations of the study. The Use of Statistical Package for the Social Science (SPSS) was extensively used by the researcher in statistical analysis. Descriptive statistics was attained through cross tabulation, frequencies, and descriptive ratio statistics. Cross tabulation involved the process of creating a contingency table from the multivariate frequency distribution of statistical variables.

4.2. Distribution of sample by schools and gender
Table 4.1 shows the distribution of schools and gender. The sample contained one hundred and ninety five repeat takers from day schools (195) and sixty six (66) repeat takers from boarding schools. Female repeat takers comprised of forty point six percent (40.6%) of the sample

Table 4.1:School type vs. Sex Cross tabulation

			Sex		
			Female	Male	Total
School type	Day	Count	74	121	195
		% of Total	28.4%	46.4%	74.7%
	Boarding	Count	32	34	66
		% of Total	12.3%	13.0%	25.3%
Total		Count	106	155	261
		% of Total	40.6%	59.4%	100.0%

4.3 Regression Analysis

Regression analysis was done with second attempt grade as dependent variable and first attempt grade as independent variable.

4.3.1 Inter-correlation matrix of variables

Table 4.2 below shows the inter-correlation of the dependent and independent variable involved. The correlation between the first attempt grade and the second attempt grade is 0.832. This correlation is large enough to allow for regression analysis.

Table 4.2: Correlations

		Second Attempt Grade	First Attempt Grade
Pearson correlation	Second Attempt Grade	1.000	.832
	First Attempt Grade	.832	1.000
Sig. (1-Tailed)	Second Attempt Grade	.	.000
	First Attempt Grade	.000	.
N	Second Attempt Grade	261	261
	First Attempt Grade	261	261

4.3.2 Regression coefficients

Table 4.3 below shows the unstandardized and standardizedregression coefficient. The unstandardized regression coefficient is 0.825 with a standard error of 0.032. The regression coefficient lies between 0.757 and 0.892 at 95% confidence interval. Therefore the regression model between the second attempt grade (criterion variable) and the first attempt grade (predictor variable) is:

Second attempt grade $= \mathbf{2.834 + 0.825}$ first attempt grade

Table 4.3: Showing Regression coefficients

Model	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound

| 1 | (Constant) | 2.834 | .241 | | 11.764 | .000 | 2.359 | 3.308 |
| | First Attempt Grade | .825 | .034 | .832 | 24.154 | .000 | .757 | .892 |

4.3.3 Testing that the slope is significantly different from zero

From table 4.3 above, the probability for the t-value (24.154) was <0.05. The null hypothesis that the slope (0.825) was not significantly different from zero was rejected. Thus second attempt grade has a significant influence on first attempt grade.

4.3.4Testing the model's goodness of fit

From table 4.4 belowthe prediction of second attempt grade using first attempt is informed by a proportion of 0.693. This means that the remaining proportion of 0.307 is explained by other variables that were not captured in this study.

Table 4.4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.832[a]	.693	.691	.648

a. Predictors: (Constant), first attempt grade

b. Dependent Variable: second attempt grade

4.4 Logistic Regression Analysis

In this study binary logistic regression analysis was done with second attempt grade (Automatic university entry grade=1 and university entry grade=0) as criterion variable and first attempt grade(Minimum university entry grade=1, and below minimum university entry grade=0)being predictor variable. Logistic regression analysis was used to determine the repeat takers' membershipin one of the groups defined by the dichotomous dependent variable (second attempt grade).

4.4.1Relationship of individual independent variable to dependent variable

From table 4.5 belowthe probability of the Wald statistic (66.805) for the variable First attempt grade was less than the level of significance of 0.05. The null hypothesis that the b coefficient First attempt grade was equal to zero was rejected. This does not support the claim that "the second attempt grade is independent of First attempt grade of repeat takers. The value of Exp (B) was 0.018 which implies that a one unit increase in First attempt grade increase the odds by 0.018that repeat takersscores an automatic university entry grade.

Table 4.5: Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	Upper
Step 1[a]	Firstattemptgrade1(1)	-4.038	.494	66.805	1	.000	.018	.007	.046
	Constant	1.147	.181	39.972	1	.000	3.150		

a. Variable(s) entered on step 1: Firstattemptgrade1.

4.5 Discriminant analysis

Discriminant analysis was used to analyze relationship between the repeat takers' second attempt grade (non-metric)dependent variable and age, first attempt grade (metric), sex, type of school (dichotomous) independent variables.Discriminant analysis attempts to use the independent variables to distinguish among the groups or categories of the dependent variable**.** There were two groups of the dependent variables; Minimum university entry grade and Automatic university entry grade.

4.5.1 Normality of independent variables: First attempt grade and Age

The variables Age and First attempt grade (metric variables) were tested for normality. From Table 4.6 belowthe transformed variables inverseage (Age) and inversegrade1 (First attempt grade) satisfies the criteria for normal distribution. The skewness (-0.391 and 0.625) and kurtosis (0.698 and -0.540) are between -1.0 and 1.

Table 4.6: Descriptive Statistics

	N	Mean		Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Age	261	19.38	.055	.889	.791	.754	.151	1.439	.300
First attempt grade	261	6.96	.073	1.173	1.375	-.069	.151	-.908	.300
Inverseage	261	.0517	.00014	.00231	.000	-.391	.151	.698	.300
inversegrade1	261	.1480	.00164	.02647	.001	.625	.151	-.540	.300
Valid N (listwise)	261								

4.5.2Sample size – ratio of cases to variables

The initial sample size before excluding outliers and influential cases was261cases. With 4 independent variables, the ratio of cases to variables is 65.25 to 1, satisfying both the minimum ratio of 5 cases for each independent variable and the preferred ratio of 20 to 1.

In addition to the requirement for the ratio of cases to independent variables, discriminant analysis requires that there be a minimum number of cases in the smallest group defined by the dependent variable. The number of cases in the smallest group must be larger than the number of independent variables, and preferably contain 20 or more cases. The number of cases in the smallest group in this problem was 130, which is larger than the number of independent variables (4), satisfying the minimum requirement. In addition, the number of cases in the smallest group satisfies the preferred minimum of 20 cases.

4.5.3 Assumption of equal dispersion for dependent variable groups

Box's M test evaluated the homogeneity of dispersion matrices across the subgroups of the dependent variable. The null hypothesis was that the dispersion matrices are homogenous.

In this analysis, Box's M statistic had a value of 50.325 with a probability of >0.01. Since the probability for Box's M is greater than the level of significance for testing assumptions (0.01), the null hypothesis was notrejected and the assumption of equal dispersion was satisfied.

Table 4.7: Test Results

Box's M		50.325
F	Approx.	16.635
	df1	3
	df2	1.210E7
	Sig.	.005

Tests null hypothesis of equal population covariance matrices.

4.5.4 Testing functions for statistical significance

In table 4.8 the Wilks' Lambda was used to testfunctions for statistical significance, the stepwise analysis identified one discriminant function that was statistically significant. The Wilks' lambda statistic for the test of function 1 (chi-square=272.345) had a probability which was less than or equal to the level of significance of 0.05.

Table 4.8: Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	.389	243.817	2	.000

4.5.5 Testing for Multicollinearity

Multicollinearity is indicated when the tolerance value for an independent variable is less than 0.10. The tolerance values for all of the independent variables was larger than 0.10 as shown in Table 4.9. Multicollinearity was not a problem in this discriminant analysis.

Table 4.9: Variables in the Analysis

Step		Tolerance	Sig. of F to Remove	Min. D Squared	Between Groups
1	First attempt grade	1.000	.000		
2	Inversegrade1	.933	.000	.253	University entry grade and Automatic university entry grade
	School type	.933	.000	4.996	University entry grade and Automatic university entry grade

Table 4.10: Variables Not in the Analysis

Step		Tolerance	Min. Tolerance	Sig. of F to Remove	Min. D Squared	Between Groups
2	Sex	.988	.929	.422	6.269	University entry grade and Automatic university entry grade
	Inverseage	.998	.932	.750	6.247	University entry grade and Automatic university entry grade

4.5.6 Independent variables and group membership: relationship of functions to groups

Function 1 separates repeat takers who scored automatic university entry grade (the positive value of 1.245) from repeat takers who scored minimum university entry grade (negative value of -1.254) in their KCSE second attempt.

Table 4.11: Functions at Group Centroids

	Function
Second attempt grade 2	1
University entry grade	-1.254
Automatic university entry grade	1.245

Unstandardized canonical discriminant functions evaluated at group means

4.5.7 Predictor loadings on functions

Based on the structure matrix Table 4.17below , the predictor variables strongly associated with discriminant function 1 which distinguished between repeat takers who scored automatic university entry grade from those who scored university entry grade in their KCSE second attempt were First attempt grade (r=0.895) and school type(r=0.201).

Table 4.12: Structure Matrix

	Function
	1
Inversegrade1	.895
School Type	.201
Age[a]	-.045
Sex[a]	.041

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions
 Variables ordered by absolute size of correlation within function.

a. This variable not used in the analysis.

4.5.8 Predictors associated with first function
From table 4.18 below, the average grade of repeat takers that was related to an automatic university entry grade in their second KCSE attempt was a B- (7.79) as compared to those with an average grade of a C (5.96) who scored a minimum university entry grade. This supports the relationship that automatic university entry grade attained in second attempt is dependent on minimum university entry grade attained in the first attempt. Boys repeat takers generally showed higher achievement than girls repeat takers in attaining both automatic and minimum university entry grades in their second attempt

Table 4.13: Group Statistics

Second attempt grade 2		Mean	Std. Deviation	Valid N (listwise) Unweighted	Weighted
University entry grade	Sex	.6077	.49015	130	130.000
	School Type	.1462	.35463	130	130.000
	inverseage	.0516	.00219	130	130.000
	inversegrade1	.1678	.02142	130	130.000
Automatic university entry grade	Sex	.5802	.49543	131	131.000
	School Type	.3588	.48148	131	131.000
	inverseage	.0518	.00244	131	131.000
	inversegrade1	.1284	.01286	131	131.000
Total	Sex	.5939	.49205	261	261.000
	School Type	.2529	.43549	261	261.000
	inverseage	.0517	.00231	261	261.000
	inversegrade1	.1480	.02647	261	261.000

4.6 Summary of the results
The data used in this study were for 261 repeat takers in 106 public secondary schools drawn randomly from four districts. Scatter plots showed that the relationship between the repeat takers' second attempt grade and first attempt grade could be estimated by a linear function. Histograms and normal plots for the predictor and criterion variables suggested that the distribution of scores were appropriate for regression analysis. The regression analysis showed a significant relationship between the second attempt grade and first attempt grade with a correlation of 0.832.
Several models were fitted to find out the role of first attempt grade, sex, age, and type of school in influencing the validity of first attempt grade in predicting the second attempt grade of repeat takers.Logistic

regression analysis between second attempt grade (attainment of automatic university entry grade or university entry grade) and first attempt grade (minimum university entry grade or below minimum university entry grade) shows that repeat takers who had minimum university entry grade in their first attempt had more chances of attaining an automatic university entry grade in their second attempt than those with below minimum university entry grade in their first attempt. Discriminant analysis done with second attempt grade (attainment of automatic university entry grade or university entry grade) and four independent variables, found out that first attempt grade distinguished more between the repeat takers who scored automatic university entry grade from those who scored university entry grade than type of school with correlation of 0.895 and 0.201 respectively.

CHAPTER FIVE
CONCLUSION AND RECOMMENDATION
5.1 Introduction
This final chapter presents important findings that address the research hypothesis in this study. The implication of these findings in the context of education policy that may be useful for decision makers are discussed.

5.2 Validity of First attempt grade
It was found that repeat takers' first attempt grade had a significant positive relationship with second attempt grade. The proportion of variance explained by the first attempt grade on second attempt grade was 0.832. In other words, 0.832 of the variance in second attempt grade was explained by the differences in the repeat takers' first attempt grade. It was also found that a one point grade increase in first attempt grade increased the second attempt grade by $0.825 \cong 1$ point.

The logistic regression analysis establishedthe value of Exp (B) as 0.018 which implies that a one unit increase in First attempt grade increase the odds by 0.018 times that repeat takers scores an automatic university entry grade. This supports the findings of regression analysis. The minimum first attempt grade needed for one to score a minimum university entry grade was C (5.96) and for and automatic university entry grade was B- (7.79).

5.3 Influence of age and gender
The results found out that the influence of age and gender on the repeat takers' second attempt grade was non-significant.Age and gender were isolated from variables that distinguished between repeat takers who scored automatic university entry grade from those who scored university entry grade in their KCSE second attempt by discriminant analysis.

5.4 Influence of type of school
The type of school repeat takers sat for their KCSE second attempt was found to have moderate relationship with automatic university entry grade attained in the second attempt.Repeat takers in boarding schools tended to score automatic university entry grade than day schools

5.5 Implications for Education policy
This study showed that the first attempt grade of the repeat takers is significantly related to the second attempt grade attained. There is need for enhanced career guidance in schools to help repeat takers in making informed decision before they re-consider taking the exam again. The government's policy of limiting the number of times a repeat taker should re-take the exam to three should also be reviewed.

5.6 Future Research

Future research on predictive validity of repeat takers' first attempt grade should be a large scale study that will incorporate all levels. More school level variables such as location of school (Rural versus urban), nature of school (public versus private) should be included. Student level variables such as number of times repeated, socio-economic factors, personal factors such as intelligence, motivation, attitude status should be included in future study.

REFERENCES

Braxton, J. (. (2003). *Persistence as an essential gateway to student success.* San Francisco: Jossey-Bass.

Franklin Wabwoba & Fullgence M. Mwakondo. (2011). Students Selection for University Course Admission at the Joint Admissions Board (Kenya) Using Trained Neural Networks. *Journal of Information Technology Education*, 334.

Kaplan, R. M. (2009). *Psychological Testing: Principals application & Issues.* California: Wadsworth, Cengage Learning.

Kenya National Bureau of Statistics. (2011, April Tuesday). *University Enrollement.* Retrieved December 12th , 2012, from Kenya National Bureau of Statistics: http://www.knbs.or.ke/university%20enrolment.php

Kigotho. (2001, March 19). *Admissions fraud at university in Kenya may have gone on for years, officials say.* Retrieved January 2, 2013, from The Chronicle of Higher Education: http://chronicle.com/article/Admissions-Fraud-at-University/107411/

Kuncel, N. R. (2005). A meta-analysis of the Pharmacy College Admission Test and grade predictors of pharmacy student success. *American Journal of Pharmaceutical Education*, 69,339-347.

Kuncel, N. R. (2007). A Comprehensive meta-analysis of the predictive validity of the Graduate Management Admission Test (GMAT) and undergraduate grade point average (UGPA). *Academy of Management Learning and Education*, 51-68.

Lin, T.-C., Yu, W.-C., Chen, Y.-C., & and Kauffman, D. (2011). Determinants and probability prediction of college student retention: New evidence from the probit model. *International Journal of Education Economics and Developement*.

Mwiria, K. N.-O. (2007). *Public & Private Universities in Kenya: New challenges, Issues, & Achievements.* Oxford, UK: James Currey.

Otieno, J. J. (2008). Higher education in Africa: The International dimension. *Centre for International Higher Education*, 238-261.

Reporter, N. (2010, March 2). *Thousands to miss places in varsities.* Retrieved December 30, 2012, from Daily Nation: http://www.nation.co.ke/News/-/1056/872072/-/vr5n6u/-/index.html

Republic of Kenya Kenya (2005). *Economic Survey.* Nairobi: Central Bureau of Statistics, Ministry of Planning and National Development.

Salvia, J. &. (2007). *Assessment in special and inclusive education.* Boston: Houghton-Mifflin.

Schmitt, N. K. (2009). Prediction of 4 year college student performance using cognitive and non cognitive predictors and the impact of demographic status on admitted students. *Journal of Applied Psychology*, 94,1479-1497.

Wanyama, H. (2011, August 30). *Kenya: Board admits 32,600 to public universities.* Retrieved December 2, 2012, from The Star: http://www.the-star.co.ke/news/article-51385/board-admits-32600-public-universities

Young, J. (2001). *Differential validity, differential prediction, and college admission testing.* New York: College Entrance Examination Board.
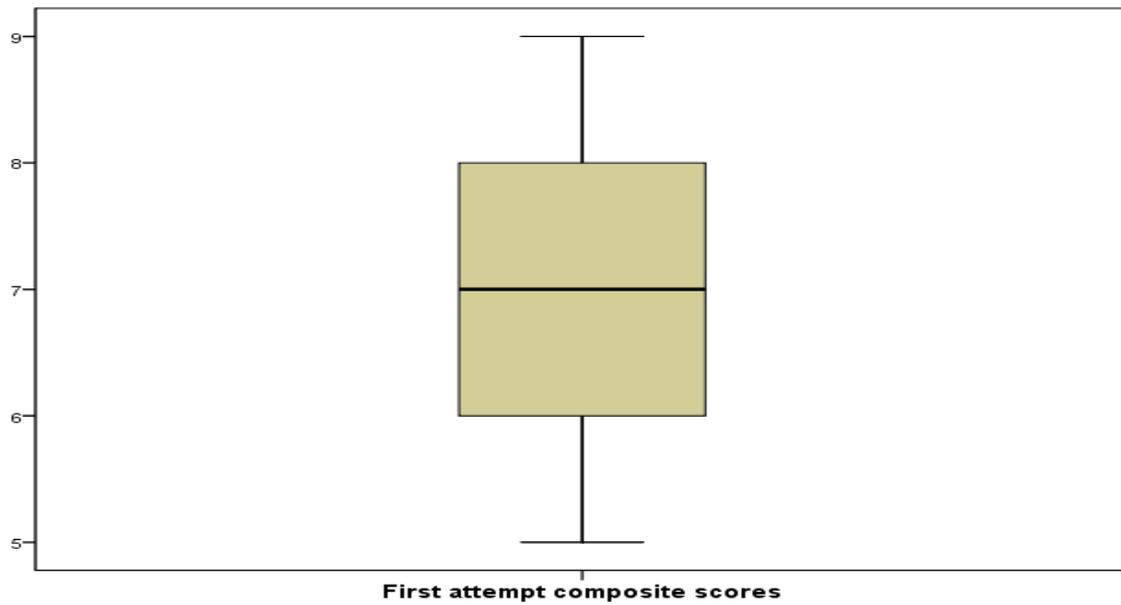
APPENDIX 1

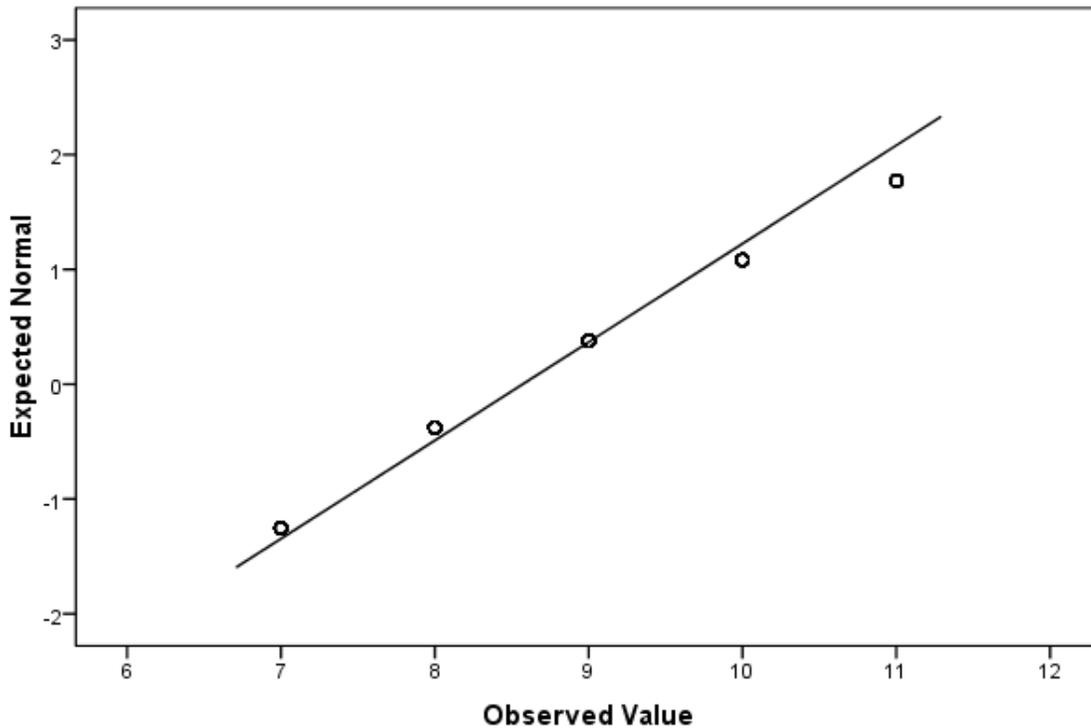Scatter plot of Second attempt grade against First attempt grade
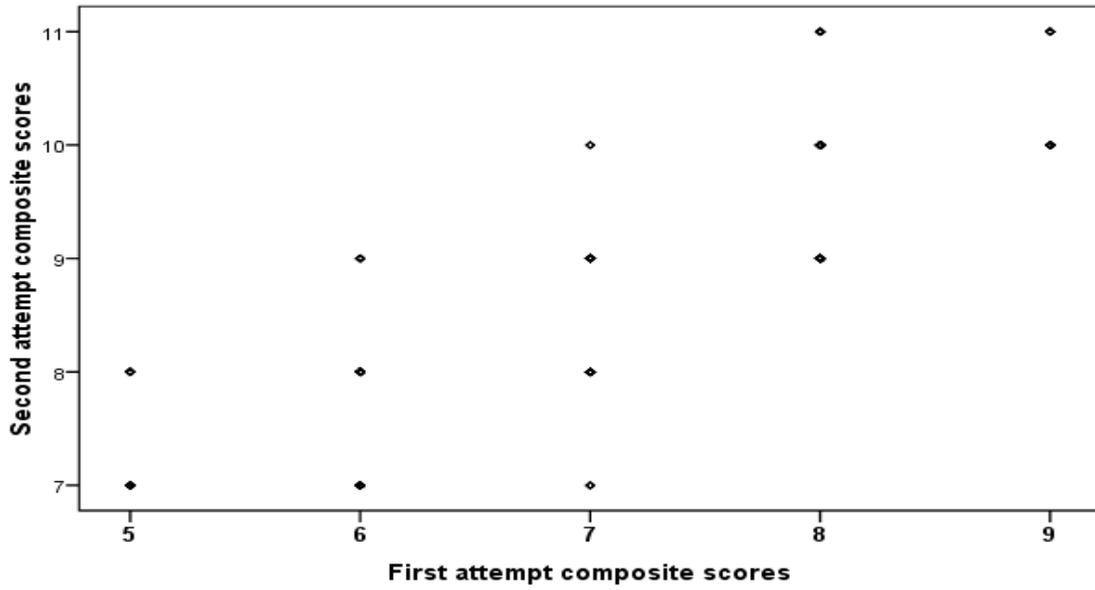
APPENDIX 2

Box plot for First attempt composite scores

APPENDIX 3

Normal Q-Q Plot of Second attempt composite scores