Predictive Validity of (KCSE) Mathematics Score on Financial Accounting Score of University Undergraduates at CUEA-Gaba Campus, Eldoret, Kenya

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This study sought to establish the predictive validity of KCSE mathematics score on financial accounting score of university undergraduates. The objective was to establish whether KCSE mathematics score contributes information that can predict financial accounting score of university undergraduates at CUEA- Gaba campus Eldoret. The study adopted a correlation research design. The target population for the study comprised of 45 students. 28 students were randomly selected from 45 students using simple random sampling. Document analysis guide was the main tool for data collection. Data was analysed using quantitative statistics. Correlation coefficient was calculated to determine the relationship between the scores and results presented using tables with the aid of SPSS. The study revealed that there is no significant relationship ($r = 0.203$) between the KCSE mathematics score and financial accounting score of university undergraduates. The study recommends that institutions of higher learning should admit students to accounting course based on many other factors other than their KCSE mathematics score.

Keywords: Predictive validity, KCSE mathematics score, Financial Accounting score

Introduction

Higher education institutions use a range of sources of information to determine who should be offered a place to study one of their courses. These sources of information include, among others, prior educational attainment, personal statements and academic references. Admission practices usually vary between institutions but, in general, prior qualifications and attainment are the main criteria used by those institutions. It is therefore important that such qualifications, when used for university selection purposes, demonstrate that they are valid predictors of academic performance.

In Kenya, the vast majority of students applying to study a course in a higher education institution hold academic qualifications such as KCSE /A levels. However, increasing proportions of students now enter higher education with alternative qualifications. For example, GCSE/A levels are sometimes supplemented with or replaced by other academic qualifications such as applied or vocational qualifications such as applied A levels, advanced diplomas.

Predictive validity comes to mind when mention is being made of the effectiveness with which an examination could forecast students' or candidates' future performance in related tasks. Predictive validity refers to the extent to which a test

could accurately

forecast the extent to which a person would perform in a future related activity. It is an important sub-type of criterion-related validity, and it is the extent to which a test performance is related to some other measure of performance in the future. The concept of predictive validity is a term used to describe the capacity of a measuring instrument to forecast future performance in a related task, (Faleye & Afolabi, 2005). Predictive validity is the degree of correlation between the scores on a test and some other measures that the test is designed to predict (Afolabi, 2012).

A number of factors potentially affect the predictive validity of test items. These factors are capable of affecting reliability, since reliability is an essential factor in ensuring validity(Badmus & Omoifo, 1998). Other factors include those relating to the test itself, such as, the nature of the items, their psychometric properties of discrimination and distracter abilities and the homogeneity of the items. Most employment and educational tests are used to predict future performance and as a result predictive validity is regarded as essential in these fields.

Predictive validity takes the grades achieved after the first year of studies (criterion scores), and compares them with the secondary school performance (predictor score) in similar subjects. A high correlation indicates that the selection procedure worked perfectly, a low correlation signifies that there is something wrong with the approach. However, most studies usually show that there is a strong correlation between the two, and the predictive validity of the method is high, although not perfect. There is a weakness in the type of data being tested in predictive validity.

The educational system adopted by Kenya is the 8-4-4 system of education where the child spends 8 years in primary school, 4 years secondary school and 4 years in the university which is being replaced by a new system of 6-3-3-3 where the child will spend 6 years in primary school, 3 years in junior and 3years in senior secondary schools and 3years in the university. At each and every stage

of the child's education, emphasis is laid on numeracy which is seen as a basis for cognition and determinant/predictor of student's academic achievement. The argument being that Mathematics boosts the students' arithmetical reasoning. This subject is core for understanding all subjects taken by the student including Financial Accounting. Numerical ability is associated with intellectual capacity of the individual, hence the emphasis on a pass in Mathematics, which serves as prerequisite or a precondition for admission into Kenyan universities. It is generally believed that, students' academic success is contingent on individual's proficiency in Mathematics and students' who possess a passes in this core subject tend to perform better academically in future.

Previous knowledge and capability of a student in Mathematics is assumed to be responsible for high performance. The universal selection theory conjectures that all knowledge and knowledge growth are due to a process of cumulative blind variation and selection (Cziko, 1997). In other words, knowledge and knowledge growth are achieved through an aggregate of conscious and unconscious historical activities and choices. In context, students' selection of programmes and university selection criteria give regard to varied factors including previous subject knowledge as these are perceived to be contingent on future knowledge growth and performance. The university admission system in Kenya and that of many other countries is based on this theory.

Grades acquired in prerequisite subjects at secondary schools are one of the basic requirements for obtaining admission into institutions of higher education in Kenya. It is expected that the grades obtained in prerequisite subjects at secondary school level can promote academic progress with regards to a more in-depth understanding and performance of students into their area of specialization. This assumption made all the programmes of studies in Kenyan universities to emphasise on at least pass grades in some relevant subjects. Based on this, any student opting for business course in

the university should have at least a pass in mathematics. The knowledge and skills acquired at secondary school in this subject will help to develop students' critical thinking, problem solving, teamwork, time-management and writing skills. Basic skills and knowledge gained at secondary school helps to develop in students the understanding, critical thinking and technical skills to meet the educational challenges at higher education (Adamu & Musa, 2012). Therefore student's prior performance in prerequisite subjects at secondary school tended to carry over to success of students in universities.

Mathematics forms the basis for many subjects. The skills acquired in mathematics are very importance to accounting, business administration, business education, insurance and finance students in higher institutions. The skills in this subject enhance student's reasoning and problem-solving capabilities. Bearing in mind the importance of this subject, courses such as business administration, accounting and finance and a host of others require a solid understanding of basic in skills and knowledge of mathematics for students opting for the programmes(Adamu & Musa, 2012).

The concern of educational planners and other stakeholders today, is how to ensure goal attainment in education; this implies achievement of high quality performance by both teachers and students. Educational researchers with every passing day are grappling with the imperative of trying to identify which factors can serve as predictor of students' performance in the class room. To some of these researchers, a good background in Mathematics enhances students' cognition and therefore, it is a predictor of academic success. Those students who are proficient in this subject are assumed to perform better than those without. In other word, the overall performance of students in school is said to be gauged by their background of Mathematics.

The Concept of Predictive Validity

Predictive validity is the ability of assessment tool to predict future performances either in some activity or on another assessment on the same construct, (Brown and Coughlin, 2007). Predictive validity refers to the degree to which the operationalization measures can predict (or co-relate)with other measures of the same construct that are being measured at sometime in the future.

Predictive validity which refers to the degree of correlation between the measure of concept and some future measure of the same concept requires all assessments to have evidence of the reasonableness of the proposed interpretation, as test data in education have little or no intrinsic meaning. Because of the passage of time, the correlation coefficients are likely to be somewhat lower for predictive validation studies. Both types of validity are estimated with simple correlation coefficients, (Gonnela and Rothstein, (2004).

The constructs purported to be measured by assessments are important to students, faculty, or in general the school management and therefore requires solid scientific evidence of their meaning. Assessments are not valid or invalid; rather, the scores or outcomes of assessments have more or less evidence to support (or refute) a specific interpretation (such as passing or failing a course). Validity is approached as hypothesis and uses theory, logic and the scientific method to collect and assemble data to support or fail to support the proposed score interpretations, at a given point in time. Data and logic are assembled into arguments - pro and con - for some specific interpretation of assessment data.

The concept of predictive validity is used to describe the capacity of measuring instrument to focus future performance in a related task. Gonnela, and Rothstein, (2004), define predictive validity as a measurement of how well a test predicts future performance. It is a form of criterion validity, in which the validity of a test is established by measuring it against known criteria. In order for a test to have predictive validity, there must

be a statistically significant correlation between test scores and the criterion being used to measure validity. Investigation into the predictive validity of public examinations on students' future academic achievement in various contexts is well known (Gonnela, and Rothstein, 2004).

In predicting academic performance, Daniel and Schouten (1970), emphasized the use of grades in examination and reported that grades could serve as prediction measures. They argued that a prediction of a future examination could be made with reasonable success on the basis of a previous examination led credence to this point thus confirming the outcomes of other researchers that GCE and secondary certificate examination and results provided the best predictor of university performance, (Uboko Bong, 1993).

From the various studies reviewed on predictive validity none focused on the predictive validity of Kenya Certificate of Secondary Education (KCSE) mathematics score on financial accounting score of university undergraduates. Therefore this study investigated the predictive validity of (KCSE) mathematics score on financial accounting score of university undergraduates.

The most common use for predictive validity is inherent in the process of selecting students for university. Most universities use high-school grade point averages to decide which students to accept, in an attempt to find the brightest and most dedicated students. In this process, the basic assumption is that a high school pupil with a high grade point average will achieve high grades at university. The most common use for predictive validity is inherent in the process of selecting students for to join other higher institutions.

Most universities and colleges use high school grade point averages to decide which students to accept, in an attempt to find the brightest and most dedicated students. In this process, the basic assumption is that a high-school pupil with a high grade point average will achieve high grades at university (Owoyomi 2000).

Quite literally, there have been hundreds of studies testing the predictive validity of this approach. To achieve this, a researcher takes the grades achieved after the first year of studies, and compares them with the high school grade point averages (Powell, 2010). A high correlation indicates that the selection procedure worked perfectly, a low correlation signifies that there is something wrong with the approach. Most studies show that there is a strong correlation between the two, and the predictive validity of the method is high, although not perfect. Intuitively, this seems logical; previously excellent students may well struggle with homesickness or decide to spend the first year drinking beer. By contrast, underachieving college students often become dedicated, hardworking students in the relative freedom of the university environment.

Why Predict Academic Performance

The term *academic performance* has been described as the scholastic standing of a student at a given moment (Adeyemi, 2008). It refers to how an individual is able to demonstrate his/her intellectual abilities. The scholastic standing could be explained by the grades obtained in a course or groups of courses (Owoyomi, 2000). Predicting student's academic performance is critical for educational institutions because strategic programs can be planned in improving or monitoring student's performance during their period of study in the institution (Zaidah and Daliela, 2007). Prediction of examinations can be used for selection of students who will succeed in further academic endeavours (Omirin and Ale 2008). It also prepares students in readiness for final examinations.

Predictions of examinations are meant to reveal how successful teachers' instructions have been mastered, Omirin and Ale (2008). Teachers use prediction examinations (internal examinations) to know how students are progressing and where they are having trouble they can use the information to make necessary instructional adjustments such as re-teaching, trying alternative instructional approaches or offering more opportunities for prac-

tice. These activities can lead to Predicting individual student's performance attracts considerable interests in the business world when making decisions as to whom to hire and whom to promote.

The main products of universities are students. Upon graduation, the students may either continue into the post graduate programme or become manpower for the industry, government and private sector, Zaidah and Daliela (2007).Thus the student's performance is critical in ensuring the supply chain is fulfilled. Universities therefore, use predictive examinations to make decisions regarding the potential of candidates' academic study. For this purpose, admission examinations have been used as tools for predicting academic performances and ultimately for deciding admission into academic programs.

Predictive validity of examinations can be further used to provide explanations about why people do or do not perform a particular behaviour and to suggest strategies for changing that behaviour,. Prediction of a future examination could be made with reasonable success on the basis of the results of previous examinations.

Predictive examinations are designed to determine each student's likelihood of meeting some criterion score on the end of year tests. A good example is the formative examinations which are conducted by teachers at the classroom level to assess learning in preparation for teachers' summative examinations at the end of the year to determine achievement of learning objectives of the course content for that particular level of study.

For both of these decisions, information is used to infer future performance. Track record in previous employment, academic training, interviews, references and personality and intelligent tests are some of the information that are used for deciding (Kuncel, Hezlett, and Ones, 2001).

Prediction of Academic Achievement in Post-Secondary Education

Most universities in Kenya use high school grade point averages to decide which students to accept, in an attempt to find the brightest and most dedicated students (Education Abstract, 2004/5). In this process, the basic assumption is that a high school student with a high grade point average will achieve high grades at university.

Predictive validity evidence indicates how well an assessment can predict scores obtained at a later day through the use of either the same measure or a different measure. Predictive validity is defined as how accurately test data can predict criterion score that are obtained at a later time (American educational association, American Psychological association and national council on measurement in education, 1999). Predictive validity is crucial when a test is used to predict the likelihood of some future performance. It indicates the extent to which an individuals' future performance on the criterion is predicted from prior test performance.

Several studies have been conducted to investigate the best predictors of future academic performance in US and other developed countries' post-secondary institutions. In spite of these studies there are no complete explanations of variance of academic achievement in these institutions (Sackettet al., 2001). People who are responsible for admission need some standards on which to base their admission decisions. They have usually relied on cognitive predictors such as high school GPA and standardized test score to differentiate between applicants.

The related literature indicates that, apart from the demographic factors such as gender and ethnicity, studies in this field have concentrated on two broad categories: cognitive predictors and non-cognitive predictors. Cognitive predictors cover such areas as high school academic performance and college entrance test scores, while, non-cognitive predictor relates to two main attributes: personality characteristics (such as self-motivation, self-directedness, dedication to studies and social skills) and environmental factors (such as size of schools, location of schools, parental education and socio economic status) (Wolfe & Johnson, 1995).

Several studies have been conducted to determine more accurate predictors of future academic success in postsecondary institutions. Some researchers gave priority to cognitive predictors (Hezlett, & Ones, 2001, 2004; Kuncel, Credé, & Thomas, 2007),

Statement of the Problem

Accounting is a crucial term in our modern society. The massive growth of the business world with increased complexities of accounting and financial reporting requires skilful personal to handle the financial records or to teach the subject. As a result, students' performance at undergraduate level is considered as the basis to determine competent persons to manage the financial records or to teach the subject. Mathematics is concerned with accurate numerical measurement of precisely defined operational skills. Accounting and mathematics are resemblance within the educational settings (Ibrahim & Usman, 2015). The approach in mathematics will serves as the foundation for student's success in accounting (Adamu & Musa, 2012; Sani, 2011).

Despite the importance attached to mathematics on students opting for accounting, students with little knowledge of the importance of prerequisite entry skills, generally complain that emphasizing on it is a strategy for admission denial and has no impact on student's academic achievement. An entry grade is a poor predictor of academic performance and that the degree performance cannot be linked to validity of grades obtained in the entry qualification (Majasan & Bakare, 1979). There is very low and insignificant degree of relationship between scores of students in the requisite theoretical education (Ihiegbulem, 1988).

Research Questions

The researcher seeks to answers the following research questions:

1. What was the students Kenya Certificate of Secondary Education mathematics score?

2. What is the students' score in financial accounting?

3. What is the relationship between Kenya Certificate of Secondary Education (KCSE) mathematics score and financial accounting score of university undergraduates?

Research Hypothesis

The following research hypothesis was addressed:

1. Is there a relationship between Kenya certificate of secondary education (KCSE) mathematics score and financial accounting score?

Methods

Research Design

This study was designed along the lines of a correlation research design. Gay, (1996) described correlation research as that involving the collecting of data in order to determine whether and to what degree a relationship exists between two or more quantifiable variables. Correlation research design generally entails rigorous and replicable procedures for understanding relationships indicating whether and to what degree a relationship exists between the quantifiable variables. It also explains how characteristics vary together and predicts one from the other. This design may suffer from linearity assumption, randomness of the variables and bivariate normal distributions, however these are insignificant compared to its contribution to this study.

Sample

The sample comprised of 28 students undertaking bachelor of commerce accounting option for the academic years 2017 and 2018. The data concerning the 28 students was collected through the use of document analysis guide. These students were chosen because they were the specialising in the accounting course.

Instrumentation

Document analysis guide was the main tool for secondary data collection. The selection of this tool was guided by the nature of data collected, the time availability and data analysis as well as the research questions of the study. The overall aim of the study was to establish the predictive validity of KCSE mathematics score on financial accounting score of university undergraduates in Gaba campus. The researcher is mainly concerned with the scores of the students; such information can be best collected through the use of document analysis guide (Touliatos and Comton, 1993). Document analysis will be used to obtain data from the academic registry in the university campus.

Validity

To ensure validity of the instrument, a committee of three experts in accounting was formed to judge whether the instrument was relevant to the research questions and appropriate for the study.

Pilot Study of the Research Instrument

The document analysis guide was pilot-tested with 10 accounting students who were not part of the study at The Eldoret national Polytechnic. The research instrument was revised after pilot- testing.

Reliability of Research Instrument Results

The reliability of the results was assessed using split-half technique. An r of 0.78 was found to be appropriate.

Data Collection Procedure

Quantitative data was collected from the academic records of 28 students during the period January 2018 and May 2018 using document analysis guide. The data was collected by the researcher herself because of the confidential nature of the information being collected.

Data Analysis

Data was analysed descriptively and inferentially. Descriptively the data was analysed through the use frequencies, means and the standard deviations and inferentially the data was analysed through Regression analysis. The hypothesis was tested by use of ANOVA.

Results and Discussion

The results are given according to the research questions.

KCSE Mathematics Scores

Table 1
KCSE Mathematics Score

KCSE Mathematics Score	Frequency	percentage
3	1	3.6
4	2	7.1
5	1	3.6
6	4	14.3
7	11	39.3
8	2	7.1
9	2	7.1
10	3	10.7
11	2	7.1
Total	28	100.0

Table 1 shows the general distribution of KCSE mathematics scores with the lowest score being 3 and the highest being 11. The modal score was 7 with a frequency of 11.

KCSE Mathematics Score and Gender

Table 2
KCSE Mathematics Score and Gender

Gender	N	Mean	Std. Deviation
Male	17	7.82	2.157
Female	11	6.36	1.433

Table 2 indicates the group statistics on KCSE mathematics score and the gender. The mean score of the male students was 7.82 with standard deviation of 2.157 and that of the female students was 6.36 with a standard deviation of 1.433. This therefore means that the scores in males had higher variance as compared to those of the female students. In summary females scored better than the males in KSCE mathematics scores.

Financial Accounting Scores

Table 3
Financial Accounting Scores

Score	Frequency	percentage
41	1	3.6
43	1	3.6
45	1	3.6
50	3	10.7
51	1	3.6
52	1	3.6
54	1	3.6
55	2	7.1
56	2	7.1
60	5	17.9
61	1	3.6
62	1	3.6
63	2	7.1
64	2	7.1
67	1	3.6
69	1	3.6
71	1	3.6
72	1	3.6
Total	28	100

Table 3 indicates the financial accounting scores distribution, the highest score was 72 and the least was 41. The most common score was 60 with a frequency of 5 and a percentage of 17.9.

Financial Accounting Score and Gender

Table 4
Financial Accounting Score and Gender

	Gender	N	Mean	Std. Deviation
Score	Male	17	59.53	6.530
	Female	11	54.73	9.467

Table 4 indicates the financial scores of both the male and female students. The male students had a mean score of 59.53 with a standard deviation of 6.53. The females had a mean score of 54.73 with a standard deviation of 9.47. As it can be noted the scores in the females were more dispersed as compared to that of the males. Therefore in this case males performed better than the females.

Relationship between KCSE Mathematics and Financial Accounting Scores

Table 5
Relationship between KCSE Mathematics and Financial Accounting Scores

		KCSE Maths Score	Financial Accounting Score
KCSE mathematics score	Pearson Correlation	1	.20
	Sig. (2-tailed)		.30
	N	28	28
Financial accounting score	Pearson Correlation	.203	1
	Sig. (2-tailed)	.30	
	N	28	28

Table 5 shows a Pearson correlation of 0.20 which when interpreted reflects a weak positive correlation between KCSE mathematics score and Financial accounting score.

A significance of 0.30, This means that there is a very weak positive correlation between the two variables under study in that only 29.9% of the dependent variable is explained by the independent variable and the remaining 70.1% is explained by other factors that are not captured by this model. This means that the KCSE mathematics score is a poor predictor of the financial accounting score.

Test of Hypothesis

On testing whether KCSE mathematics score contributes information for prediction of financial accounting score, scores on KCSE mathematics score were regressed to the scores of financial accounting. The independent variable was KCSE mathematics score and the dependent variable being the financial accounting score and simple linear regression was used to find the regression line. Then ANOVA for significance of the regression line was used to test the significance of the line at 0.05 significant.

Null Hypothesis (H_0)

The null hypothesis stated that: KCSE mathematics score contributes no information for prediction of financial accounting score

Regression Analysis

Table 6
Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	.203[a]	.041	.005	7.99

a-Predictors: (Constant), KCSE mathematics score

Table 6 indicates that the correlation between the two variables is a very weak positive correlation with an r of (0.203) and a coefficient of determination ($r^2 = 0.04$) i.e. product moment correlation coefficient of (4.1%). This means that only 4.1% of the variation in financial accounting score is accounted for by KCSE mathematics score. In other words 95.9% of variation in financial accounting score is due to factors other than KCSE mathematics score: perhaps environment, age, type of school, experience.

Analysis of Variance (ANOVA)

Table 7
ANOVA[b]

	Sum of Squares	df	Mean Square	F	Sig.
Regression	71.69	1	71.69	1.12	.30[a]
Residual	1660.74	26	63.88		
Total	1732.43	27			

a. Predictors: (constant), KCSE mathematics score
b. Dependent variable: financial accounting score

As indicated in Table 7, the value of p (0.30) calculated is greater than the critical value (0.05) hence the null hypothesis is not rejected. Therefore for this sample, K.C.S.E mathematics score contributes no information in predicting financial accounting score of university undergraduates. The results indicate that there is no significant relationship between KCSE mathematics score and their score in financial accounting. In other words the KCSE mathematics score do not predict a student's score in financial accounting for the target population.

Regression Analysis

	Unstandardised Coefficients		Standardised Coefficients	t	Sig.
	B	**Std. Error**	**Beta**		
(Constant)	51.77.81	5.75.77	.20	9.01	.000
KCSE maths score				1.06	.30

a. Dependent Variable: Financial accounting score

Table 8 indicates the regression equation of the form $y = 51.77 + 0.81x$ meaning that a unit (1%) change in X (KCSE mathematics score), explains only 0.81% i.e. 8.10% change in the dependent variable Y (Financial accounting score) with a p value of 0.30. This means that 91.9% of the changes in Y (dependent variable) financial accounting score is not accounted for by the changes in the independent variable x (KCSE mathematics score). This therefore is an indication that other factors such as the environment, age, experience, resources, motivation could be the major determinants of the changes in the financial accounting scores.

Conclusion

Based on the three research question this study concluded the following:

On research question one: KCSE mathematics scores, it can be concluded that overall the student performed fairly well since the mean scores of both male and female students was above the mark of 50%. The male students obtained a mean of 7.82 and a standard deviation of 2.157. The female students got a mean of 6.36 with a standard deviation of 1.43. Based on this analysis it can be concluded that female students performed better than their male counterparts in the sense that their variance was lower than that of the male students.

On research question two: Financial accounting scores, the performance was generally good since the mean scores of both the male and female students was above 50%. The males had a mean score of 59.53 with a standard deviation of 6.530 while the female students had a mean score of 54.73 with a standard deviation of 9.467. Based on these it can be concluded that the male students out performed their female students by an absolute margin of 4.8. Based on the variance, the male students had a lower variance as compared to that of the female students with an absolute margin of 2.937.

On research question three: the relationship between KCSE mathematics score and financial accounting score. The Pearson correlation gave a figure of 0.203 which means a very weak positive correlation between the two variables.

On hypothesis testing: a significance of 0.30 was revealed. This means that only 29.9% of the dependent variable is explained by the independent variable and the remaining 70.1% is explained by other factors that are not captured in this model. Therefore the study concluded that KCSE mathematics scores do not contribute significant information for prediction of financial accounting scores.

Recommendations

Basing on the conclusions of the study the following recommendation is proposed:

Higher institutions of learning should not base their admission criteria on KCSE mathematics score only but should also consider other factors such as the experience, motivation and gender of the students seeking admission into the accounting course. Since this study focused on the accounting course only, other studies should be done to look at other courses offered at the university level. In addition, the study was also carried out at a private university in Uasin Gishu County. Further studies should be done at public universities in the same county or a different county.

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