

The Predictive Validity of College Admission Criteria the Case of 2007/08 Entrants of Kotebe College of Teacher Education

Yoseph Shumi*

Abstract: The main purpose of the study was to assess whether or not admission criteria used by Kotebe College of Teacher Education (KCTE) are valid in predicting success in college academic performance. Four hundred twenty five regular diploma program students were included in the study from 2007/08 academic year entrants. The Ethiopian General Secondary Education Certificate Examination GPA, high school average score, and entrance exam result of these students were collected from the document of the Registrar's Office and Recruiting Committee of KCTE. Correlation and regression analyses were employed on the data. The results indicated that high school average score, entrance exam result and EGSECE GPA in order as selection instruments appeared to be valid predictors of first semester college GPA and jointly accounted for 13.20 percent of the variation in College's performance. Based on their predictive power, high school average score was the most important admission variable followed by entrance exam result while EGSECE GPA was the least important admission variable. Finally, implications of the results of the study are indicated.

Background of the Study

Kotebe College of Teachers Education (KCTE) is one of the oldest colleges of teacher education in Ethiopian. It was established in 1959 with the task of preparing junior secondary school teachers. Gradually, however, it began to train teachers for different level of education in the country. Over the years, the college has trained over 35,000 primary and secondary school teachers in the regular, extension and summer in-service programs (KCTE, 2007).

Through continual pursuit of excellence in its instructional and research programs, KCTE has the following objectives:

* Lecturer, Department of Education/Psychology, Kotebe College of Teacher Education

- To produce adequate number of teachers who satisfy the required quality for schools in Addis Ababa and some regions (as deemed necessary) through its regular, evening-extension and summer in-service programs.
- To conduct problem-solving research in different areas of education.
- To provide social services related to the teaching profession, schools, training centers, etc.

These objectives can be attained by recruiting and selecting good quality trainees, among others. In the words of Ayers and Gebhard (1988), the mission of teacher education programs is to identify and prepare effective teachers. Attempting to assure quality in the graduates of teacher education programs is as pressing as predicting the effectiveness of a particular teacher in a particular job setting. Substantiating the above idea, Bridges (1998, p. 363) comments on the quality of teacher education and training in Ethiopia as follows:

....if we want the best teachers available, then a first step is to recruit into training those who already have the best range of relevant attributes and abilities, and that these include considerably more than the narrowly academic ability which tends to dominate the usual selection procedures.

Bridges emphasizes the usefulness of considering various criteria while recruiting students for colleges of teacher education.

The college recruits students for the 10 +3 diploma program using interviews and written examinations. A student who has passed the EGSECE is eligible to sit for the entrance examination (KCTE, 2007). However, in 2007/08 academic year, KCTE admitted students to its regular program using criteria that had three components. These are EGSECE GPA (15%), entrance exam result (with 45% weight) and high school average score (with 40% weight). But the college did not assess the predictive validity of its

selection criteria. This study has been designed to assess whether or not the criteria set to admit students to diploma program really predict academic success at KCTE.

Statement of the Problem

Colleges and universities in different corners of the world use different selection criteria to admit students to their diploma and degree programs. The selection criteria are based on the potential ability of the student to perform well in the program, the economic need of the society, the space available in the institution offering the program etc. (Gayle and Jones, 1973). In most cases, colleges use test scores, entrance examination and high school result. In addition to these, some institutions require candidates to appear for interviews (Bridges, 1998).

After studying teachers' recruitment criteria practiced by different institutions, Applegate (1987) suggested that selection criteria are needed to address a series of issues including the relationships that exists among entry criteria, program goals and exit criteria. The implication of Applegate's suggestion, among others, is that there is a pressing need for validation studies aimed at determining the extent to which admission criteria relate to the programs of the institutions. In fact, the main objective of admission criteria is to identify students who will complete the training and go into professional careers, and those who do well and profit from the training program (Gayle and Jones, 1973; Hogrebe, Eruin, and Dwinell, 1983). The value of the selection criteria can be assessed by the degree to which it can fulfill this objective. Such an assessment should not be considered as something to be done at once, but rather as continuing and systematic evaluation of the selection techniques (Cronbach, 1990).

Applicants for college admission should be typically selected on several variables, which are used as predictors of their potential to perform successfully in the training program (Anastasi, 1976). When certain variables are used as predictors in the selection process a significant relationship

should be made between those predictor variables and the criterion variable, which measure the training performance. Consequently, questions about the adequacy of predictor variables for the purpose they serve are answerable on scientific grounds by evaluating psychometric evidence (Howell, 1992; Kerlinger, 1986; Koul, 1996).

Here the college grade point average (GPA) is the most widely accepted criterion measure of academic success in college, and thus for predictive validity study in higher institution, first semester college GPA is usually used as a criterion measure (Eggen and Kauchak, 2001; Gronlund and Linn, 1990; Mehrens and Lehmann, 1991; Wiersma and Jurs, 1985). Test scores are considered valid predictors of college success if they are related to a measure such as the first year GPA. It is generally accepted that college admission should not be based on a single criterion such as test score (Wiersma and Jurs, 1985). Furthermore, it seems reasonable that students who do well in high school will most likely do well in college (Shepard, 1993). In general most of the predictor variables in selection of students for higher institutions are based on cognitive variables such as test scores, high school average score, entrance examination, etc.

Validity studies have been conducted on some of these selection criteria. It was found that high school average scores and test scores were the most important predictors of college performance (Fantu, Zelalem, and Belay, 1996; Gage and Berliner, 1998; Shepard, 1993; Wiersma and Jurs, 1985). Besides, the combination of high school scores and test scores yield some what better prediction than either taken alone.

In the selection and admission process we have to assure whether the criteria we use are valid, whether they help us admit the applicants with the best chance of success, and whether they enable us to eliminate those with the poorest chance of success (Gayle and Jones, 1973). Likewise, it is essential to validate the selection criteria used here at KCTE. No attempt has been done yet concerning the predictive validity of the selection criteria used by the College. The major purpose of this study, therefore, is to assess

whether or not the selection criteria used by KCTE are valid in predicting success of students in college academic performance.

Based on this purpose, an attempt is made to answer the following basic questions.

1. Is there a statistically significant relationship between EGSECE GPA, high school average score, entrance exam result and first semester GPA in college study?
2. Which of the predictor variables is the most important in explaining the variation in the first semester GPA in college study?

Significance of the Study

Researchers in the area emphasize the use of selection criteria that best predict success in college studies. Specifically, Willingham (1974), for example, explained that compared with lower levels of schooling most tertiary programs are costly. They are also intellectually demanding. Willingham emphasizes the need to use good admission criteria to tertiary education programs. If we use the best predictors, the loss will be minimum. Thus, according to Willingham, using measures that predict success study minimizes human power and resource wastage.

Therefore, it is significant to validate the selection criteria used by KCTE. Hence, this study is hoped to shade some light on how valid the current KCTE selection criteria are. The finding may help the college to understand the impact of each selection criterion and make necessary arrangements in the weights of the recruitment criteria, if necessary. Finally, the results of this study may show future directions of research in the area.

Delimitation of the Study

This study is delimited to the 2007/08 diploma regular program entrants of KCTE. Even though the college has been offering 10 +3 diploma program

since 2003/04, due to time constraint, this study did not consider regular program students who joined the college from 2003/04 to 2006/07. Moreover, the study has not considered summer and evening program participants since selection criteria for these programs are different. Furthermore, the study is delimited to three admission measures: EGSECE GPA, high school average score, and entrance exam result having weight 15%, 40% and 45% respectively during selection process. Sex and non-cognitive measures were not included in the study as admission measures.

Limitations of the Study

This study has its own limitations. The study used first semester GPA of students' college performance, since it is the only readily available criterion measure for 2007/08 entrants. Had it been at least first year cumulative GPA, it would have made the study more sound. Besides, it is known that correlation coefficient is based on the reliability and validity of scores on predictor and criterion variables. However, there are some defects on the psychometric quality of tests used by colleges and universities. This study, like other predictive validity studies, shares this problem.

Definition of Important Terms

In this study the following terms are defined as follows.

Criterion measure refers to the student's first semester GPA in the college examinations.

EGSECE GPA refers to the average of the scores in seven subjects where mathematics and English are compulsory with a minimum of C grade.

High school average score refers to the overall average score of grades 9 and 10.

Predictive validity refers to the extent to which predictor variables are accurate in predicting or forecasting college performance; the extent of the relationship between predictor variables (i.e., EGSECE GPA , entrance exam result & high school average score) and criterion measures(i.e., first semester college GPA).

Predictor variables refer to the admission criteria used by the college (i.e., EGSECE GPA, entrance exam result and high school average score).

Methods of the Study

The main purpose of this study was to assess whether or not admission criteria used by KCTE are valid in predicting success in the students' academic performance in the college. The subjects and variables of the study, procedure of data collection and method of data analysis are presented below.

Subjects

The subjects of this study were diploma regular program students who were admitted to the college in 2007/08 academic year. From a total of 438 entrants of that academic year, 425 students (i.e., 97.03%) were included in the study. Thirteen students (i.e., 2.93%) who did not sit for the first semester final examination of the 2007/08 academic year were excluded from the study. Female students constitute 146 of the 425 students included in the study.

Variables of the Study

Predictor Variables

The admission criteria used by KCTE were considered as predictor variables in this study. They were entrance exam result(X_1), high school average score(X_2) and EGSECE GPA(X_3).

Criterion Measure

The criterion measure used was student's first semester GPA in the college exam. This was done because it is the readily available measure of success for students who joined the college in 2007/08.

Procedures of Data Collection

The study was carried out with the permission and interest of the College authorities. Documentary analysis was conducted to secure the required data. More specifically, the researcher collected high school average score, entrance exam result and EGSECE GPA of 2007/08 entrants from the document of the Recruiting Committee of the College. Each student's first semester academic performance in the college (i.e., GPA) was gathered from the Registrar's Office.

Methods of Data Analysis

The following statistical methods were used in the analyses of the data. Descriptive statistics such as mean and standard deviation were computed to determine the average scores and variability of scores. This was followed by analyses of relationships among variables.

Pearson Product Moment correlation coefficients were computed among variables to see the relationships among them. In addition, multiple regression analyses were conducted to see the contribution of predictor variables for the variations on the criterion measure. Following the regression analyses, stepwise regression was employed to identify and select the predictor variables that best explain the variation in the criterion variable.

Alpha value of 0.05 was used to test significance of the contribution of each predictor variable and the linear combination of the independent variables to the dependent variable.

Results of the Study

The data were analyzed in accordance with the research questions using the Pearson Product Moment correlation, regression analysis, and stepwise regression analysis. Tables below show the descriptive statistics, correlation matrix, multiple regression, and stepwise regression analyses.

Table 1: Means and Standard Deviations of the Predictor and Criterion Variables (N=425)

Variables	Mean	Standard Deviation
Entrance Exam Result	31.66	5.64
High School Average Score	64.73	5.61
EGSECE GPA	2.22	0.16
College GPA	2.42	0.51

The results of the standard deviation (Table 1) indicate that there is a relatively low variation among students in their EGSECE and college GPAs and high variation in their entrance exam result and high school average score.

In this part of the study, the research question considered was determining the extent of relationships between entrance exam result, high school average score and EGSECE GPA, and student's first semester GPA in college study. To this end, correlation analysis and multiple regression analysis were computed.

Table 2: Inter-correlations among Predictor and Criterion Variables (N = 425)

Variables	Entrance Exam Result	High School Average Score	EGSECE GPA	College GPA
Entrance Exam Result	1.00	0.22**	0.07	0.23**
High School Average Score		1.00	0.13**	0.30**
EGSECE GPA			1.00	0.13**
College GPA				1.00

** $P < 0.01$ (Correlation is significant at 0.01 level (2-tailed))

Table 2 presents the correlation of predictor variables (Entrance Exam Result, High School Average Score and EGSECE GPA) with the criterion variable (College GPA). The highest correlation coefficient observed was the correlation between high school average score and college GPA ($r = 0.30$, $p < 0.01$). The second highest correlation coefficient observed was the correlation between entrance exam result and college GPA ($r = 0.23$, $p < 0.01$). The correlation between EGSECE GPA and college GPA was 0.13, which is a low correlation coefficient compared to the other predictor variables.

In Table 2, inter-correlations among predictor variables are also presented. As shown above, high school average score was significantly correlated with EGSECE GPA ($r = 0.127$, $p < 0.01$) and entrance exam result ($r = 0.22$, $p < 0.01$). The correlation coefficients among these predictor variables suggest that there is some overlap between predictors. But the correlation between entrance exam result and EGSECE GPA was not statistically significant ($r = 0.07$, $p > 0.05$).

Besides, inspection of the results of inter-correlations among variables in Table 2 exhibits that the directions of the relationship are all positive.

Table 3: Summary of Multiple Regression Analysis (N = 425)

Variables	Coef. (b)	Std Error of b	Beta	t	P	R	R ²
Constant	-0.41	0.418	-	-0.97	.33	0.36	0.13
Entrance Exam Result (X ₁)	0.02	0.004	0.19	4.05	.00		
High School Average Score(X ₂)	0.02	0.004	0.24	5.16	.00		
EGSECE GPA (X ₃)	0.38	0.152	0.12	2.52	.01		

The regression equation is $y' = -0.407 + 0.017X_1 + 0.022X_2 + 0.383X_3$.

Table 3 shows multiple regression analysis. The predictor variables used were entrance exam result, high school average score, and EGSECE GPA. The criterion measure employed was first Semester College GPA. As can be seen from the Table 3, the multiple correlation coefficients obtained was 0.36 which means the extent to which college GPA is related to entrance exam result, high school average score and EGSECE GPA. The coefficient of determination (R^2) was 0.13. Accordingly, the variance accounted for by the predictor variables jointly (or together) was 13.20 percent. This means that 13.20 percent of the variance on college GPA was explained by the three-predictor variables. The remaining 86.80 percent of the variance in the criterion measure is left unexplained.

As shown in Table 3, t-value for the regression coefficient of entrance exam result was statistically significant ($b_1 = 0.02$, $t_1 = 4.05$, $df = 42$; $P < 0.001$). This means entrance exam result contributes significantly to the regression (or prediction of college success), the other two independent variables being taken into account. Likewise, t-value for the regression coefficient of high school average score was statistically significant ($b_2 = 0.02$, $t_2 = 5.16$, $df = 42$; $P < 0.001$). This means that high school average score contributes significantly to the regression, the other two independent variables being

taken into account. Similarly, t-value for the regression coefficient of EGSECE GPA was statistically significant ($b_3 = 0.38$, $t_3 = 2.52$, $df = 42$; $P < 0.01$). This means EGSECE GPA contributes significantly to the prediction of college success, the other two independent variables being taken into account.

Table 4: Summary of Analysis of Variance (N=425)

Source	Sum of Squares	df	MS	F	P
Regression	14.68	3	4.90	21.38	0.000
Residual	96.55	421	0.23		
Total	111.24	424			

$P < 0.001$

F-test was employed to see whether the obtained R arises by chance or departs sufficiently from chance expectation. As indicated in Table 4, the regression of college GPA on the three predictor variables (Entrance Exam Result, High School Average Score and EGSECE GPA), expressed by R, was statistically significant [$R = 0.36$, $F(3, 42) = 21.38$, $P < 0.001$]. Thus, the regression equation allows us to predict at better than chance levels. In other words, the relation between college academic performance and the best linear combination of entrance exam result, high school average score and EGSECE GPA could probably not have occurred by chance.

In multiple correlations, researchers are more interested in R^2 than in R, because it can be directly interpreted in terms of percentage of accountable variation. Thus, R^2 of 0.13 indicates that 13.20 percent of the variance in college GPA was predicted on the basis of the three predictors.

The other important question to be answered in this part was identifying the predictor variable that is more important in explaining the variation in the first semester GPA in college study. In order to answer this question, stepwise regression analysis was used.

Table 5: Summary of the Stepwise Multiple Regression Analysis (N = 425)

Step	Variables Entered	Coef. (b)	Std. Error of b	Beta	T	P	R	R ²	F	Change in R ²
1	High School Average Score	0.03	0.004	0.30	6.43	.000	0.30	0.09	41.21*	-
2	High School A.S. Entrance Exam	0.02 0.02	0.004 0.004	0.26 0.18	5.55 3.79	.000 .000	0.35	0.12	28.51*	0.03
3	High School A.S. Entrance Exam EGSECE GPA	0.02 0.02 0.38	0.004 0.004 0.152	0.24 0.19 0.12	5.16 4.05 2.52	.000 .000 .012	0.36	0.13	21.38*	0.01

*Significant at 0.001

Table 5 shows a summary of the stepwise multiple regression analysis of the predictor variables, which are more important in explaining the variation in college GPA. From Table 5, it can be seen that high school average score, entrance exam result, and EGSECE GPA were the three predictor variables that entered into the regression model but in different steps. That is, high school average score was the most important predictor variable, in explaining the variation in college GPA that entered the regression model in the first step. It explained 8.9 percent to the variation in college GPA. Entrance Exam was the second important variable, in explaining the variation in college GPA that entered the regression model in the second step. It improved prediction of the college GPA by 3.0 percent. EGSECE GPA was the third important variable, in explaining the variation in college GPA that entered the regression model in the third step. It added 1.3 percent to the variance of college GPA.

Discussion

The major findings of the study would help to answer the basic questions raised in this study.

As far as the first question is concerned, the findings showed significant relationships between admission criteria and college first semester GPA. As the computation of inter-correlations among variables showed (Table 2), the

predictor variables (Entrance Exam Result, High School Average Score, EGSECE GPA) are significantly related to the first semester college academic performance (GPA) independently.

In addition to the correlation analysis, multiple regression analysis (Table 4) was worked out, and this revealed that the admission criteria together made a significant contribution in the prediction of first semester college GPA ($R = 0.36$, $R^2 = 0.13$, $F(3, 421) = 21.38$, $P < 0.001$).

The study indicates that high school average score, entrance exam result and EGSECE GPA appeared to be important and significant variables in predicting students' success in college academic performance. Thus, the admission measures, which were used in 2007/08 academic year by KCTE, were found to be significant predictors of success in college academic performance.

However, this study is not the first of its kind since there are some studies that reported similar findings. For example, the study carried out by Workneh (1999) reported that English language entrance examination, ESLCE GPA and high school average score appeared to be better predictors of first semester GPA of the candidate teachers at Arbaminch Teacher Training Institute. Of course, the result of this study revealed that 13.20 percent of the variance in college first semester academic performance was accounted for by variation in entrance exam result, high school average score, and EGSECE GPA. The largest portion of variance, 86.80 percent, was left unexplained.

The possible explanation for such a large unexplained variance in first semester GPA may be due to the fact that other factors such as achievement motivation, study habit and specific content background affect performance in college. Eggen and Kauchak (2001) supported this conclusion. Besides, researchers (e.g., Daniel, 1998; Ebel and Frisbie, 1991) indicate that such non-cognitive variables play important role in determining students' success in educational activities. On the other hand, many

analysts concluded that the reasons for varying and usually quite low correlations were the result of statistical artifacts inherent in the restriction in the range of test scores (Howell, 1992; Hurlburt, 2003; Mehrens and Lehmann, 1991). This is the case of EGSECE GPA. As revealed in Table 2, the least correlation coefficient between predictor variable and criterion variable was the correlation between EGSECE GPA and college GPA ($r = 0.13$). The possible reason for this is the restriction in the range of EGSECE GPA distribution. Among 425 students, 261 students (61.41%) scored 2.14; and 137 students (32.24 %) scored 2.29 in EGSECE. This means 93.65 percent of students scored 2.14 and 2.29; and the remaining 6.35 percent of students scored beyond 2.29 in EGSECE. From this data, it is possible to conclude that the group tends to be homogeneous in this particular admission variable. Consequently, validity coefficient decreases due to the restriction of range (homogeneity) on EGSECE GPA distribution. Thus, restriction on the range of EGSECE GPA distribution partly contributed to the huge unexplained variance in the first semester GPA in college performance.

As stated in the earlier part of this report, the second question in the study was identifying the predictor variable that is more important in explaining the variation in the first semester GPA in college study. In order to answer this question, stepwise regression analysis was used.

The results of the stepwise regression analysis (Table 5) indicated that high school average score was the most important variable in explaining the variation in college performance. High school average score alone accounted for 8.9 percent of the variance on the first semester GPA [$R^2 = 0.09$, $F(1, 423) = 41.21$, $P < 0.001$].

The second variable that entered the regression model was entrance exam result [$R^2 = 0.12$, $F(2, 42) = 28.51$, $P < 0.001$]. This means when entrance exam result was added, R^2 was increased to 0.12. This variable, next to high school average score, is found to play an important role in the variation of college GPA. This is confirmed by the fact that the change in R^2 due to

entrance exam result is significant [change in $R^2 = 0.03$, $F(1, 422) = 14.37$, $P < 0.001$].

The third variable that entered the regression model was EGSECE GPA ($R^2 = 0.13$, $F(3, 421) = 21.38$, $P < 0.001$). This means when EGSECE GPA was added, R^2 was increased to 0.132. This variable, next to high school average score and entrance exam result, is found to play an important role in the variation of college GPA. This is confirmed by the fact that the change in R^2 due to EGSECE GPA is significant (change in $R^2 = 0.01$, $F(1, 421) = 6.35$, $P < 0.012$).

The present result goes along with the results of the previous studies (e.g., Fantu et al., 1996; Kebede, 1991; Yetbarek, 1998; Workineh, 1999) which indicated that high school result is the most important and significant variable in predicting students' ability to succeed in higher learning institutions. According to Wiersma and Jurs (1985), there are frequent cases in which high school achievement predicted first year grades better than scholastic achievement or aptitude tests. This may not be a surprise because high school performance determines college performance. Furthermore, high school average scores are rather based on performance over a period of time rather than on one-shot evaluation.

Summary, Conclusions and Recommendations

The main purpose of this study was to assess whether or not admission criteria used by KCTE are valid in predicting success in college academic performance. The data collected were analyzed using correlation, multiple regression and step wise regression analyses. Accordingly, the following results were found.

1. The inter-correlations among variables indicate that the relationship between the predictor variables and the criterion measure are statistically significant at the 0.01 level and the directions of the relationship are all positive.

2. The result of multiple regression analysis reveals that 13.20 percent of the variance in the college first semester performance was accounted for by variation in the three predictor variables.

3. The F-test reveals that all the three predictor variables significantly contributed to the prediction of the criterion measure at 0.01 level of significance.

4. The summary of the stepwise multiple regression analysis shows that high school average score was the most important admission variable which accounted for 8.90 percent of the explained variance. This is followed by entrance exam result (3.00 percent) and EGSECE GPA (1.30 percent)

From the preceding findings, therefore, it may be possible to arrive at the following conclusions.

1. High school average score, entrance exam result and EGSECE GPA as selection instruments appeared to be valid predictors of success as defined by the first semester college GPA.
2. High school average score was found to be the most valid predictor of first semester GPA followed by entrance exam result.
3. Although EGSECE GPA was a statistically significant predictor of first semester GPA, it was the least predictor of the variables considered in this study.
4. The combination of the three predictor variables was found to be statistically significant to predict the academic performance of college students. However, only 13.20 percent of the variance in college performance was explained by the predictor variables. Thus, the largest portion of the variance, (i.e., 86.80 percent,) was left unexplained.

Based on the findings of the study, the following recommendations were made.

1. High school average score was found to be a more influential variable in predicting success in the first semester college academic performance than the other 2 variables: entrance exam result and EGSECE GPA. Entrance exam result was found to be more influential in predicting success in the first semester college academic performance than EGSECE GPA. Thus, it would be better to consider them on the basis of their importance during admission process.
2. It would be better to evaluate entrance exam and other tests for their reliability and content validity, since these factors may affect the validation process.
3. It would also be better to consider students choice of streams or departments in relation to their interest and high school course results. These variables may affect their college performance.
4. The findings suggest the need to conduct further research to ascertain the predictive power of admission measures in forecasting success in college academic performance. In doing this, considering additional predictor variables like sex and non-cognitive variables (e.g., study habit and achievement motivation) may help in explaining the variation in college performance. Further research in this regard will help to determine the weight of each predictor variable.

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