

# **PREDICTORS OF ACADEMIC ACHIEVEMENT FOR FIRST YEAR STUDENTS. THE CASE OF WOLAITA-SODDO UNIVERSITY, ETHIOPIA**

*Zebdewos Zekarias*

*Nasser Aba-Milki*

*Fisseha Mikre*

Department of Psychology, Jimma University, Ethiopia

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## **Abstract**

The objective of this study was to find out the factors that predict first year, first semester academic status of students at Wolaita-Soddo University in 2013/14 academic year. The study involved correlation design that attempted to explore the variables which predict first year university students' academic achievement. The populations in the study were 3407 first year students enrolled at Wolaita-Soddo University (Ethiopia) in the academic year 2013/14. Of these, 2142(63%) were males and 1265(37%) females and 345 participants were selected by stratified multistage sampling techniques. The data were collected using archival sources and survey questionnaire method. The collected data were analyzed using descriptive statistics and regression analysis. The results of multiple regression analysis showed that grade 12 average mark and university entrance exam score accounted for 43.5% ( $R^2=0.435$ ,  $F=129.2$ ,  $p<0.05$ ) in achievement and socioeconomic variables explained 18.8% ( $R^2=0.188$ ,  $F=15.383$ ,  $p<0.05$ ) of the variance in the first semester university grades respectively. Grade 12 average mark was found to be the variable that relatively accounted for the highest variation in students' academic achievement. Admission personnel should reconsider to give reasonable weight to grade 12 average marks because of its greater predictive power to university success in the first year study.

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**Keywords:** Predictor variable, grade 12 average mark, university grade point averages, socioeconomic status, parental education

## **Introduction**

The fields of education and psychology are concerned about the prediction of behavior, particularly in relation to learning capacity, learning

potential, growth, success and adjustment. Prediction of academic success falls within the realm of predictive validity evidence. Predictive validity indicates how well assessment results predict scores obtained at a later time through the use of either the same measure or different measure. The literature on the prediction of academic success showed that most students, despite of the academic, social, emotional and other challenges, successfully complete the transition period and achieve academic success (DeBerad, Julka & Spielmans, 2004). Others do not manage these challenges and are forced to leave their study at its early stage. First year first Semester University grade is one of the major responsible factors for early dropout of students from college (McGrath & Braunstein, 1997).

In the Ethiopian Higher Education context student enrollment is based on university entrance exam scores, aptitude test scores, and preparatory school GPA. Within the past few years, the number of public universities in the country has increased from twenty one to thirty three. Following this, the enrollment rate has dramatically increased. Nevertheless, the complex problems university students facing in relation to academic success especially during the first year are not getting attention.

The quality of university education is determined to a considerable extent by the abilities of those it admits and retains as students. There is a widespread agreement that success in university education is strongly related to pre-university academic preparation and achievement of students (Kuh, 2007). Research findings on future academic success emphasizes on two types of predictor variables, namely cognitive (prior academic achievements) and non-cognitive (socioeconomic variables). Cognitive predictors refer to the standardized entrance tests such as the Scholastic Achievement Test and American College Testing tests and achievement measures such as high school GPA and high school rank-in-class. Non cognitive predictors refer to personality characteristics, and socioeconomic statuses (Johnson, 2002).

Several studies have 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, Seiler, Klieger, & Woo, 2005). The vast majority of the predictive validity research used cognitive predictors such as high school marks and standardized test scores to predict college academic success.

In reviews of more than 60 studies Mathiasen (1984) posited that high school marks and standardized entrance test scores are the best predictors of college success as they account for approximately 25% of the variance when predicting first-year college grades. A meta-analysis study by Elert (1992) identified that high school grades were twice as good predictors of college success than college entrance test scores, with college entrance test scores accounting for only approximately 5% of additional variance in

the prediction model. Elert noted that the strength of college entrance exams is in the prediction of first-year college grade point averages, and that their predictive power disappears after the first year. Since most predictive validity studies have concluded that high school marks and standardized entrance test scores were more strongly related to college performance than any other predictors, this study focused on these two cognitive predictors. High school GPA and standardized entrance test scores could be used to make accurate predictions and appropriate admission decisions.

According to Astin, Korn, & Green, (1987) both high school marks and standardized test scores are generally significant predictors of student success during undergraduate studies. Robbins and Schwitzer (1988) also found pre-college academic characteristics (e.g., standardized exams and HSGPA) to have relatively limited power in predicting academic and non-academic adjustment to college. Betts and Morrell (1999) however noted cognitive variables, such as standardized tests, may not be the best predictors and should be supplemented with other cognitive, demographic or non-cognitive variables. Betts and Morrell (1999) reported both scholastic aptitude test scores and high school marks as significant predictors of college, and that a one-point increase in high school mark is associated with an increase of only 0.053 points in the college grade point average. Betts and Morrell found out other student characteristics to significantly predict college level achievement.

Family's socioeconomic status is based on family income, parental education level, parental occupation, and social status in the community (Eimers & Pike, 1997). Nannyonjo (2007) compared the learning achievement of pupils with parents who did not finish primary or just finished primary and pupils with well-educated parents. In the comparison, the latter has performed considerably better than the former. The highest increase in test scores was for pupils whose fathers had a university degree. Nannyonjo also found that higher percentages of rank holder belong to homes with higher parental education and higher percentage of failed students belong those who have a lower parental education.

On the other hand, family income has been said to have a positive influence on student persistence and academic achievement. Previous studies have shown that students who come from high-income and educated families have significantly predicted high college success than students from low socioeconomic status. Some potential explanations were parents in the low economic status reported lower educational expectations, less monitoring of children's school work and less overall supervision of social activities compared to students from high socioeconomic families (Jacob & Harvey, 2005).

Furthermore, research provides evidence on the relationship of parental occupation with children's academic achievement. Alwin (1976) found that the total variance explained by parental occupation on academic achievement to be 5.6%. Currie (1977) reported the correlation between son's educational attainment and father's occupational status to be 0.11, ( $p < .05$ ). These findings suggest that parents having high occupational status tend to have the associated low family size that is likely to have the time and the ability to stimulate their children towards greater academic achievement (Gottfried, 1994). Moreover, Gottfried finds that both fathers and mothers' occupational characteristics are significant, partially mediating the effect of further education. In contrast, according to Aboma (2009) aptitude test score, achievement motivation and academic self-efficacy failed to be significant predictors of university GPA. However, the study of Aboma did not consider socioeconomic variables as important predictors of first year college success. To fill the gap; this study focused on prior academic achievements and socioeconomic variables. Thus, the study attempted to widen the understanding of the major variables which predict academic success in universities and for screening of university applicants who will be well trained in specific area require the use of empirically valid and reliable selection devices. Hence, this study was conducted to achieve the following research objectives:

- Examine the relationship between grade12 average mark, university entrance exam score and socioeconomic variables with first semester university achievement.
- Pinpoint the contribution of grade 12 average mark and university entrance exam score in the prediction of first semester academic achievements of the 2013/14 entrants.
- Investigate how far the socioeconomic variables predict first year university students first semester grade point average.
- Identify the significant factors that predicting academic status of first year students in 2013/14 entrants.
- Forward possible suggestions to alleviate the observed problems.

## **Methodology**

The study followed a correlation study design that attempted to explore the key variables which predict first year university students' academic achievement. Grade 12 average mark, university entrance exam score and socioeconomic variables were utilized in predicting students' academic success (first-year, first semester university grade point average).

The study area of this research was Wolaita-Soddo University that is found in the Southern Nations, Nationalities and People's Region (SNNPR). It is located at Wolaita-Soddo town, which is around 330 kilometers from

Addis Ababa. And the populations in this study were 3407 first year students enrolled at Wolaita-Soddo University (Ethiopia) in the academic year 2013/14. Of 2142(63%) are males and 1265 (37%) are females. The students are assigned at the university from all regions of the country. The sampling method used was Multi-stage sampling specifically, stratified random sampling was used. There are a total of six colleges and three schools in the Wolaita-Soddo University, which were treated as strata in this study.

The researchers have selected colleges and schools as strata because one of the study variables was university entrance exam score that are the basis or criteria for students' placement at different colleges and departments in the university. For instance, students with relatively low university entrance exam average scores also joined the fields of business, social and applied sciences. On the other hand, students with relatively better university entrance exam average scores were assigned in the fields of studies such as medicine, technology and law based on their choices (Mulu, 2012). So the achievement variation and students' background imply heterogeneity among the strata identified. Stratified sampling was used to select a proportional sample of participants across colleges and schools and simple random sampling was used to select the required participants. The researchers selected 345 in line with (Kurtz, 1983) formula of determining the sample of participants from the target population. The sample size for each department was set proportionally using the target student population of each department.

The information and records of selected students who were admitted in 2013/14 was obtained from the admission files of the university's registrar. In this study, information collected from the university data bases was used. The data, which included grade 12 average mark, university entrance exam scores and first-year, first semester grade point average (GPA) directly recorded from the files of students. The questionnaire was adopted from a new instrument (scale) for measuring the socioeconomic status of families (Aggarwal, Bhasin, Sharma, Chhabra, Aggarwal & Rajoura, 2005). The survey questionnaire was divided into four parts. Part I include department, sex, and student identification number. Part II, dealt with educational background of parents; Part III dealt with items of parents' income and part IV dealt with items on parents' occupation. After the collection of data needed to answer the research questions, both descriptive and inferential statistics were used to analyze the data in this study. Descriptive statistics were computed for predictor and criterion variables. The statistical analyses carried out based on the basic research questions that the study aimed to answer. Correlation matrices were employed depending on the nature of the data and research questions.

## Results

All the predictor variables were separately checked with the criterion variables for their possible association by standard multiple regression and all of the predictor variables were entered in the stepwise multiple regression analysis to test their combined association on the criterion variable and those variables with p-value <0.05 was selected as possible predictor variables in the final model.

Table 3: Characteristics of Respondents.

	Male	Female	Total	Percent
Issued questionnaire	223(64.6%)	122(35.4)	345	100
Answered questionnaire	219(63.44%)	120(34.82%)	339	98.26
Unanswered questionnaire	4(1.16%)	2(0.58%)	6	1.74

As shown in table 1 the questionnaire was administered to 345 students; the analysis was made using 339 students and the remaining 6 students were unanswered questionnaire.

Table 2: Correlation Matrix Between Grade 12 Average Mark, University Entrance Exam Scores and First Semester University GPA.

Variables	1	2	3
Grade 12 average mark	1	0.274**	0.653**
University entrance exam score		1	0.265**
First semester university GPA			1

\*\* Correlation is significant at the 0.01 level (2-tailed)

Table 2 shows the correlation between grade 12 average marks and university entrance exam score with first semester university GPA. There were positive correlations between the above mentioned variables. A positive coefficient indicates that two variables systematically vary in the same direction, i.e., as one variable increases, the other variable tends to rise.

Looking at the specific variables, grade 12 average mark had a strong positive and statistically significant relationship with the first semester university grade point average of students ( $r=0.65$ ,  $p<0.01$ ) and university entrance exam score had a low positive but statistically significant correlation with first semester university GPA ( $r=0.265$ ,  $p<0.01$ ).

Table 3: Correlation Matrix Between the Socioeconomic Variables and First Semester University GPA.

Variables	1	2	3	4	5	6
Father education	1	0.483**	0.45**	-0.451**	-0.122*	0.218**
Mother education		1	0.476**	-0.582**	-0.041	0.153**
Parents income			1	-0.37**	0.007	0.4**
Father occupation				1	-0.013	-0.013**
Mother occupation					1	0.064
University GPA						1

\*\*correlation is significant at the 0.01 level (2-tailed)

\* Correlation is significant at the 0.05 level (2-tailed)

Looking at the specific variables, father education had a weak positive correlation with first semester university GPA ( $r=0.22$ ,  $p<0.01$ ), mother education had also a weak positive correlation with first semester university grades ( $r=0.15$ ,  $p<0.01$ ). On the other hand, parental income had a moderate positive correlation with first semester university grades ( $r=0.4$ ,  $p<0.01$ ), father occupation had weak negative correlation with first semester university grades ( $r=-0.013$ ,  $p<0.01$ ) and mother occupation had very low positive correlation with first semester university GPA ( $r=0.064$ ,  $p>0.01$ ). In fact, except the mothers' type of occupation, all the other predictor variables have statistically significant relationship with the first semester grade point average of the students.

Table 4: The Combined Prediction of Grade 12 Average Mark and University Entrance Exam Scores on the Criterion Variable.

Variables	R	R square	Adjusted square	Std. Error of the Estimate	F-value	Sig.
PAAS	0.659a	0.435	0.431	0.85	129.2	.000b

a. Predictors: (constant)

N.B PAAS= prior academic achievement scores (grade 12 average mark and university entrance exam score).

The results of multiple regression analysis showed prior academic achievement score measures to account for 43.5% ( $R^2=0.435$ ,  $F=129.2$ ,  $p<0.05$ ) of the variation in the criterion measure. The remaining (56.5%) of the variation was explained by the other factors. Grade 12 average mark and university entrance exam score significantly predicted first semester university grade point average.

Table 5: Summary of the Combined Effects of Socioeconomic Variables on the Criterion Variable.

Variables	R	R square	Adjusted square	Std. Error of the Estimate	F-value	Sig.
SEV	0.433a	0.188	0.175	1.022	15.383	.000b

a. Predictors: (constant),

N.B SEV= Socioeconomic Variables (father and mother education, parents' income and father and mother's occupation).

The results of multiple regression analysis showed socio economic variable measures to predict first semester university result. It accounted for 18.8% ( $R^2=0.188$ ,  $F=15.383$ ,  $p<0.05$ ) of the variation, and the remaining (81.2%) was explained by other factors. Socioeconomic variables have found to positively predict first semester university grade point averages.

Table 6: Results of Stepwise Multiple Regressions on the Regression of Academic Achievement on the Independent Variables

Model	Un standardized coefficients		Standardized coefficients	t	Sig
	B	Std. Error	Beta		
Constant	.867	.112		7.714	.000
Grade12 average mark	.669	.042	.653	15.836	.000
Entrance	.267	.053	.265	5.048	.000
PI	.398	.050	.397	7.93	.000

N.B PI= parents income

As shown in Table 6, when all the variables were entered into the regression equation grade 12 average marks, university entrance exam scores and parents' income was relatively the best predictor (significantly predicted first semester university GPA).

Step wise multiple regression analysis revealed that grade 12 average mark, university entrance exam score and parents' income significantly predicted first semester university GPA ( $b=.653$ ,  $t=15.83$ ,  $\alpha=.000$ ), ( $b=.265$ ,  $t=5.04$  and  $\alpha=.000$ ) and ( $b=.397$ ,  $t=7.93$ ,  $\alpha=.000$ ) respectively. The high beta weight of 0.653 confirms the strongest prediction to come from grade 12 average marks.

### Discussion of the results

The main purpose of this study was to find out the key predictor variables of first year first semester academic achievement of students at Wolaita-Soddo University in 2013/14 academic year. The study attempted to examine for relationships between grade 12 average marks, university entrance exam score and socioeconomic variables with first semester university grade point average, prediction power of the independent variables to the criterion variable and identify the most significant predictor of first semester grade point averages.

The correlation between grade 12 average marks and first year first semester grade was statistically significant and University entrance exam score had a low positive correlation with first semester university grade. High school marks and scholastic aptitude test scores appeared to have relatively high correlation with college GPA is in agreement with previous findings. For instance, Mekonen (1991) reported a relatively significant multiple correlation coefficient when the combination of aptitude test score, grade twelve reported average or high school average and school leaving grades were used in the prediction of freshman grades. The multiple coefficients of correlation were found to be 0.49. Likewise, another study on the association between high school GPA and first-year college GPA showed



a moderate correlation of .39 when averaged across the participating colleges. The correlation coefficients between college entrance test scores and first-year college GPA were averaged across the colleges; the results yielded a correlation of .49. The multiple correlation coefficients established was 0.6. Samson (2007) reported the combination of predictor variables, school leaving grades, entrance examination and high school average score together as relatively better predictors of the academic success of students.

From the analyses of inter-correlation between the predictors and outcome variable showed that grade 12 average marks and university entrance exam score had statistically significant relation with academic achievement of students. This is consistent with Sackett (2009) who examined different studies and found a moderate correlation between high school marks and standardized admission tests with academic performance. The relationships were strong even after controlling for non-cognitive factors like socioeconomic status. The current finding is also consistent with Kuncel, et al (2005) who concluded high school marks and rank to have relatively high criterion related validities with college grades, with correlation between .44 and .62.

The correlation coefficient for parents' education and pupils' performance was low positive correlation at 0.22 for father and 0.15 for mother (table 8) which implies that father's education influences pupils relatively better than mother's education do. It was similar to the finding of (Chiu, 2012) that reported insignificant correlation between academic achievement and the mother's level of education ( $p=.27$ ).

When income is examined as a separate variable the research shows a consistent positive relationship between family income and student achievement. The students' socioeconomic status particularly income and parental education were positively correlated with academic performance. The students with poor socioeconomic status showed poor and unsatisfactory academic performance. It was consistent with the finding of Eamon (2005) that the academic achievement of students is negatively correlated with the low parental socioeconomic status as it prevents the individual gaining access to sources and resources for learning.

Regarding parents' occupation, this study showed father and mother's occupation had no significant relation to students' academic achievements. When Grade 12 average mark and university entrance exam score taken together, accounted for 43.5% of the total variance in first semester university grades. This finding was consistent with other research works. In a review of more than 60 studies Mathiasen (1984) posited that high school marks and standardized entrance test scores are the best predictors of college success as they account for approximately 25% of the variance when predicting first-year college achievement.

Literature shows that both high school grade point averages and standardized test scores are generally significant predictors of student success during their undergraduate studies (Astin, Korn, & Green, 1987). Similarly, Betts and Morrell (1999) find that both scholastic aptitude test scores and high-school marks as significant predictors of college grades. Obviously a large number of predictive validity studies show that high school mark is consistently the best predictor of first-year college GPA and that standardized test scores do add a statistically significant increment to the prediction. Perfetto (2002) stated the combination of high school grades and standardized test scores to be common requirements for evaluating the academic credentials of applicants for admission.

With regard to socioeconomic variables, the findings of the present study are consistent with result of studies conducted by Udida (2012) who finds out students' academic performance to be significantly influenced by the socioeconomic background of parents. In order to achieve this, the multiple regression models were employed. The results show there is a high association (0.63) between parental socioeconomic background (income of parents, father's education and mother's education) and students' academic performance. The coefficient of multiple determinations ( $R^2$ ) indicates that about 40% of students' academic performance is accounted for by the combination of the above set of parental socioeconomic variables. This was supported by Nam and Huang (2009) findings that family income and liquid assets had significant impact on college attendance as well as graduation rate.

Previous studies have also shown that students who come from high-income and educated families have significantly predicted high college success than students from low socioeconomic status. Some potential explanations were parents in such settings reported lower educational expectations, less monitoring of children's school work and less overall supervision of social activities compared to students from high socioeconomic and intact families (Jacob and Harvey, 2005).

The result that grade 12 average marks is the best predictor of university grade more than standardized test scores is in agreement with previous findings (Wolfe, 1995; Aboma, 2009). These findings are different from most of the previous researches which found standardized entrance tests to explain more of the total variance in first-year college grades than high school average mark (Eimers & Pike, 1997; Willingham, 1985). This is due to university entrance exam could be one shot exams and administered every year at one specific moment. Obviously, such exams are susceptible to factors that can distort examinees true score. Among others, test anxiety and cheating during the examination can be mentioned. Moreover, these exams may lack the proper test quality which can hinder their predictive power.

Whereas grade 12 average mark was assessed in continuous ways and it reduces test anxiety which was appeared during specific moments.

Mulu (2012) find out the positive and significant relationship between the students university entrance exam score and their first year performance. At this point, it can be said that the problem may not be necessarily with the university entrance exam; rather the placement/admission decision made based on the results seems to be the major problems. Many students are allowed to join the public universities without having a passing mark in university entrance exam based on the whole admission policy. These findings prove that the aftermath of such whole admission policy can be attrition of students during their first year education, which is wastage of scarce resources and time in the public universities.

The association observed between socioeconomic predictors and university grades was generally weaker than the one observed between prior academic achievement scores and university grades. Among the socioeconomic predictors, parents' income was relatively better predictor of university grades. This is because of only parents with more income and who are willing to invest their income in their children's education by means of providing educational requirements will better enable their children to perform better. This allows them afford school fees; buy exercise books, text books and the like. One should also note that parents with more income, but unwilling to invest it in their child's education will have children who may perform poorly.

### **Conclusion and Recommendations**

Based on the findings of this study, it is possible to come up with the following conclusions. Positive and significant correlations were found between grade 12 average marks, university entrance exam score and socioeconomic variables with first year, first semester university grades. For any admission test the validity of the test for its intended purpose should be the primary consideration for the admission decision-makers. High school grade point average, parents' income and university entrance test scores are commonly used in predicting future academic performance. High school marks reflect students' performance in the twelfth grade in a variety of subjects. Parents' income reflects to support their children in providing reading materials like books and dictionaries and paying school fees create differences between children in their academic achievement. University entrance tests are based on subjects that university faculty regard as essential prerequisites for university level learning and that has shown to be positively correlated with university outcomes. Among all predictor variables examined in the study, grade 12 average mark is a key indicator of academic

performance and improved the prediction accuracy in most cases. Admission personnel should give more weight to grade 12 average marks because they have higher correlation coefficients with the criterion variable and have greater predictive power of university success than university entrance exam score. The study also indicated that students' academic performance is influenced by the socioeconomic background of their parents; as parents that earn high income can take better responsibilities of their children's education compared to parents that earn low incomes. Students whose parents have better jobs and higher levels of educational attainment and who are exposed to more educational and cultural resources at home tend to perform better than their counterparts without such opportunities. Thus, based on the findings and conclusions of this study, the following remarks were forwarded for the concerned bodies; the recommendations were put in the following ways:

- Taking some information from the students' transcript (average score of all subjects in grade 12) into account will make the admission criteria more accurate.
- According to the findings of this study, more weight should be given to grade 12 average marks rather than to university entrance exam score.
- Students from low socioeconomic backgrounds should try to persevere through financial hardships and remain in university because university eventually has a redeeming effect on their poor plight.
- Future research could also examine whether the predictive validity of first-year university grades using high school marks ,university entrance test scores and socioeconomic variables are consistent across regions (e.g., costal, interior), high school type (e.g., public, private), and high school major (e.g., Social science, Natural science).
- The findings of this study calls for an in-depth study on the reliability and validity of the university entrance examination result that is used as a major criterion to university admission in the country.
- Finally, it would also be useful to devote further study in other universities in Ethiopia by considering institutional, environmental and other variables.

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