FACTORS AFFECTING STUDENTS ACADEMIC PERFORMANCE IN HIGHER INSTITUTIONS: A CASE STUDY OF BUSINESS STUDIES PROGRAMS OF BAHIRDAR UNIVERSITY

A THESIS

SUBMITTED TO THE OFFICE OF GRADUATE PROGRAMS

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE

DEGREE OF MASTER OF SCIENCE IN STATISTICS

BY

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January 2008

ADDIS ABABA UNIVERSITY

OFFICE OF GRADUATE PROGRAMS

FACULTY OF SCIENCE

DEPARTMENT OF STATISTICS

Title of Research: Factors Affecting Students Academic Performance in Higher Institutions: A Case Study of Business Studies Programs of BahirDar University

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ACKNOWLEDGEMENT

I am immensely grateful to my advisor Professor Eshetu Wencheko, who despite the crowded schedule of his task, spent his valuable time on guiding, offering comments and suggestions that led to significant improvements at every stage of the study.

My thanks are also due to BahirDar University students, academic and administrative staffs for their cooperation during the data collection process.

Finally, I am very much indebted to members of my family, relatives and colleagues, who have given me support and encouragement.

ABSTRACT

The study was undertaken to identify factors that affect the academic performance of students at BahirDar University. The sample which is selected using stratified random sampling consists of 136 students (107 male and 29 female). Twenty-three variables that could possibly affect the academic performance of the students were considered.

Data on students past experience, parental economic and educational background, learning/studying styles/ways and socio-demographic variables like sex, age ...etc were collected using a structured self administered questionnaire.

A preliminary analysis was carried out through chi-square test and correlation analysis. The combined effect of the explanatory variables was analyzed using stepwise regression analysis.

The study revealed that EHEEQE GPA, frustration caused by fear of academic dismissal, lack of smooth interpersonal relationship between teachers and students in the teaching-learning process and whether a student studies alone or in group are the only important factors in affecting student's academic performance, and EHEEQE GPA is the first best predictor of student's academic performance.

ACRONYMS

CGPA : Cumulative Grade Point Average

EHEEQE GPA: Ethiopian Higher Education Entrance Qualification Examination

ESLSE: Ethiopian School Leaving Certificate Examination

CHAPTER ONE
INTRODUCTION

1.1 Background of the study

Education is a process by which man transmits his experiences, new findings, and values accumulated over years, in his struggle for survival and development through generations. It is also the single most powerful means to improve the quality of life and the most powerful weapon to overcome poverty. It can be considered as an important social objective of any society. The role it plays and its possible contribution to the intellectual growth and development of the society have become points of common concern in both developed and developing countries (Harbison and Hanushek, 1992). The quality of educational system of any country may reflect the progress attempts that are made in the social, economic and political aspects by that country. Education in its essence opens doors for both personal and social development. It is the aggregate of the process by means of which a person develops such qualities as curiosity, responsibility, tolerance, flexibility, independence, openness to new experiences and other forms of behavior of positive values in the society in which a person lives so that he/she can actively participate in the development of a country. In this regard higher educational institutes play a significant role.

Due to different factors, however, both the quantity and the quality of graduates from higher educational institutions in Ethiopia have become points of discussions nowadays. The number of graduates from higher institutions is far less than the number of entrants to first year programs of the institutions. Some students are dismissed just at the end of the first semester of the first year program; others withdraw or are dismissed in between. Even when they reach graduation, only few graduate with high cumulative grade points. The shortages of instructors in different higher institutions and at high school level are some indicators of these problems.

The following studies are made in an attempt to identify factors that affect student's performance in lower and higher institutions in Ethiopia.

Habte Tewoldeberhan (1988) in his study based on first year regular science students of Addis Ababa University of 1987/88, concludes that students first semester GPA relates to GPA attained in the Ethiopia School Leaving Certificate Examination (ESLCE) directly and dormitory facility indirectly. He also indicated that there is a significant difference in performance of students from other regions of the country.

Mohammed Umer (1989), in his comparative study on the performance students from Addis Ababa and other parts of the country, found that fluctuations in average performance might be attributed to factors like students personal problems.

Tsige Gebremeskel (2001), in her study of the performances of the first year entrants of the academic year 1998/99 to Addis Ababa Commercial College, found financial and personal problems as the most important factors affecting student's performance. The personal problems, according to Tsige's finding, are lack of self-confidence, feelings of loneliness, and adjustments to situations in the college. Like other researchers her analysis also showed that there was a significant difference between the performance of students from Addis Ababa and other parts of the country.

Fentaw Abegaz (2001), in his study on the comparative performance of the regular and quota entrants to higher institutions, indicates that the survival rate of the first year of the regular admission and quota admission students were 64% and 50%, respectively. He also showed that the graduation rates of regular admission and quota admission female students are 50% and 40%, respectively.

The findings cited above are contributions to research on the education system of the country. They are, however, very limited to generalize about the performance of students

in higher institutions. Some consider the performance of students in the first semester of the first year program in which the problem of adjustments to the institutions is confounded with other factors; others limited the factors for consideration to the effect of accommodation (Tsige Gebremeskel, 2001), admission type (Fentaw Abegaz, 2001).

Student's performance is, however, affected by a multiple factors and should not be confined to one semester performance. To reach a valid generalization, we need also to consider different departments, we have to consider as many semesters as possible rather than the first semester of the first year program so that adjustment problems to the institution cannot be confounded with other factors and other related issues to conclude about factors that affect student's academic performance in higher learning institutions. This study is, therefore, expected to fill these gaps.

1.2. Objective of the study

The objective of this study is to identify the factors that affect the performance of students in Bahirdar University.

Special objectives of the study are:

- to point out some critical issues for further investigation of low academic achievement of students.
- to suggest some practical recommendations that could make the school and the home environment conducive for the students to be successful in their academic achievement

1.3. Significance of the study

One major problem of most developing countries like Ethiopia is scarcity of qualified, certified and college and/or university trained people. Establishing college and/or university training can be taken as one of the solutions in tackling the problem. The common approach to the maximization of training is, however, to identify factors that affect the performance of students so that the necessary and appropriate solutions that will enable students to perform well can be made by the responsible bodies.

The output of the study is expected to serve as input for the education policy of the country in general, and improvements of education in Bahirdar University in particular and contribute to the theory of education.

Therefore, the importance of this study can be given as follows:

1. It can help instructors to study the behavior of their students and encourage the development of appropriate trait, and discourage the inappropriate ones. They can also make the necessary instructional adjustments.
2. Educational counselors will benefit from the result of this study to help students who have problems in educational performance.
3. It will provide information for those who are interested in making further research in higher educational institutions.

CHAPTER TWO
LITERATURE REVIEW

2.1 Assessing student's academic performance

Since the 1960's the question of "what makes differences in students' academic performance?" has been a central issue to educational researchers. This problem has also attracted different professionals from psychology, sociology and economics.

Scholars describe the cause that makes differences in students' academic performance from different perspectives (Schiefelbin and Simmons 1981). There seems to prevail a widespread agreement among researchers on those factors, which are favorable or unfavorable experiences of the learners which can be ascribed to home, school or community influences. It is evident that, a problem originating from home, school or community can be a cause for poor academic achievement. Thus, investigating and identifying the influences of the above mentioned factors would be a crucial task of educational leaders and researchers.

Hence, academic performance assessment is an important issue that helps educators to identify problems influencing the attainment of an optimum level of academic achievement. This leads to examine and find out where the sources of the problems are. Thus, with some source of information and examination, we could have empirical support that enable for suggesting solutions to alleviate the identified problems hindering students' academic achievement.

According to Amare Sahle (2001) a major role of teachers' is to raise the academic capability of students so that they could determine their degree of success only by making regular assessment of what their students have managed to learn. Similarly, Oliva and Pawlos (1997) stated that assessing students' academic performance is very necessary to determine whether the students have met the prescribed objectives or not.

Regarding different variables affecting students' academic performance, some researchers assume that significant differences exist between developing and developed countries. According to Kinma (1997), and Farrell and Oliverira (1993), in the developing countries, school related factors such as the availability and quality of educational facilities and materials, and qualification of teachers, etc, have stronger influence on students' academic performance than the out-of-school factors, such as family background and the school and home relations.

According to Kinma (1997) the most evident differences between the developing and developed nations are their spending levels of resources on education. In the majority of the developing nations, the considerable social inequalities make it extremely difficult for education to be efficient and effective. The major problems in developing countries have been identified as enrolment difficulties, shortage of qualified teachers, insufficiency of educational budget, lack of learning materials and facilities. But in most of the developed nations, these are not significant problems in their education system. Instead, other out-of-school factors have stronger effect on students' academic achievement in developed countries.

To support the above idea, Farrell and Oliverira (1993) forwarded the following comparison between developing and developed nations. In a nation where most students do not have textbooks, the provision of small set of basic texts for each student can have dramatic effects upon student achievement. But, for a nation where schools are already abundantly supplied with books, improvement in learning requires very difficult and costly improvement in the quality of the books. However, in a nation where most of the teachers have low level of education a modest change or increment in per-service or in-service training can have significant effect on teacher performance. But, for a rich nation such trainings cannot have significant effect on teachers performance because almost all teachers have university degrees, many have postgraduate degrees and professional development. This is a good example to show the effect of in-school and out-of-school variables affecting student's achievement in developing and developed countries.

Likewise, Cohn and Miller (1987) argued that some variables often thought to be associated closely with school quality have little effect on students' achievement. Other variables generally thought to be not important have significant bearing on students' academic achievement in developed nations. For instance, in America and England, the quality of the school facilities, such as quality of the school building, school or class size, etc, are among the variables that do not appear to be consistently related to student achievement. On the other hand, variables such as the home-school relations, family background and other out-of-school factors are more strongly related to students' achievement in these countries. But in most of the developing countries the reverse seems to be true. This suggests that once adequate facilities are provided additional spending for facilities might not enhance students' achievement.

Thus, it can be summarized that contrary to the developed countries, in developing nations school-related factors have stronger impact on the students' achievement than out-of-school factors such as family background and home-school relationships. Therefore, it is advisable that to raise students' achievement in these countries, it is necessary to improve the school inputs as much as possible and utilize the already available resources and facilities effectively and efficiently.

In the U.S.A, African Americans and Hispanics have higher dropout rates than whites. Overall, males have higher dropout rates than females; African American females, however, exceed Black males in dropout rates (National Center for Education Statistics, 1991).

An estimated 40% of children in the United States of America are at risk of school failure due to poverty, race, immigration, poor English language skill, living in a single-parent family, parents with little education, or health problems (National Commission on Children, 1991).

Gender is one aspect that shows academic achievement differences in educational institutions. In general perspectives, the academic achievement of females is low as compared to males (Amare Sahle, 2001, Abebayehu Aemro, 1998, Asmaru Berhanu, 1998, Yalew Engdawork, 2003).

Although there are variations by subject areas, a case study in Alemaya University in two faculties indicated that female students obtained lower cumulative GPA in the Faculty of Health and Education (Mamo Mengesha, 2002). About 41% of the incoming female students at Addis Ababa University were dismissed at first year mostly due to poor academic performance (Abebayehu Aemro, 1998). According to Abebayehu the academic performance of female students in higher institutes in Ethiopia was lower than their male counterparts. The reason for their high attrition rate and low academic performance was ascribed to lack of achievement oriented behavior among females and low self-esteem that is a tendency to weaken their achievement even when they perform better than or equally well as male counterparts.

Similarly, in a study made by Amare Sahle (2001) to see the effect of student's academic competence, self-determination and motivation on academic achievement in Tana Haiq Secondary High School, revealed that there exists a significant difference in academic achievement in favor of males. Asmaru Berhanu (1998) has also noted that absenteeism; attitude of pupils (low self esteem), teachers' attitude and motivation were the major causes of high repetition rate for girls in primary schools.

A survey study undertaken by the American Association of University Women (1991) to study the interaction of self-esteem and education and career aspiration in adolescent girls and boys indicated that young women and men experience a loss of self-esteem, as they grow older and older. However, adolescent women show a dramatically greater loss and such declining self-esteem affects girls more strongly than boys. It was also found out that family and schools have the greatest impact on adolescent self-esteem and aspiration.

As to the cause and effect of high attrition and low academic performance of female students, Yalew Engdawork (2003) contends that high attrition and low academic achievement of students implies not only wastage of resource, but also has a negative effect on the quality of graduates from educational institutions.

2.2 Factors that influence the academic performance of students

Academic achievement of a student is measured by the scores he/she achieves in the examination. Academic achievement can be measured in a variety of ways and the most commonly used indicator is the rate of schools completion based on statistics available on grades and standard test scores.

Psacharopouls and Woodhall (1995) considered academic achievement in educational institution expressed by the knowledge, skill and attitude developed and measured by tests, examinations and other mechanisms.

The academic achievement of students in an educational institution are affected or determined by various factors. The most important variables that affect students' success are school variables, the families and the individual social incentives and socio-economic status (Schiefelbin,E. and Creamers, B.,1989). What we call school variables are like teachers' qualification, expenditure on books, adequacy of library services, learning methods etc. These factors are generally considered as inputs to the educational institution including in fact the students themselves.

In what follows we discuss four factors that influence academic achievement of students.

2.2.1 Impact of institutional factors

School inputs that have primary importance in policy decisions are allocation of resources in terms of quality of teachers, student – teacher ratio, school size, availability

of boarding accommodation and facilities like libraries, laboratories and other instructional materials (Simmons and Alexander, 1980).

According to Reed and Bargeman (1995) an educational institution is effective when:

- There is a positive ethos where student and teachers are expected to achieve and are told they can; standards for achievement are related to individual differences; lines of communication among administrators, instructors, students parents' and community are kept open; students, from various backgrounds and cultures study and socialize together; instructors and administrators are role models for developing honesty;
- There is a class room climate conducive for learning;
- There is a clearly understood goal where students' parents and administrators agree on goals for academic achievement;
- There are effective teachers;
- There is a clear and effective leadership;
- There is good communication, active student involvement, positive incentive and reward.

In a study undertaken to examine the causes of student attrition in BahirDar University, Yalew Engdawork (2003) identified the following crucial factors as personal variables: motivation, interest, attitude cognitive and styles of learning strategies, and environmental variables; the availability of learning materials and facilities, and the administrative nature of the institution.

In relation to the importance of school variables that determine the effectiveness of educational institution and its achievement, it is found to be the responsibility of the academic administrators, teachers and students themselves. For an institution to be effective in students' success there should be strong principal leadership, high teachers' expectation for student achievement, an emphasis on basic skills and orderly environment

and frequent, systematic evaluation of students (Grovddard, et al. 2000, Scheerens and Creamers, 1989).

Research findings showed that teacher's expectations affect student learning; students are expected to learn more in order to achieve. School factors do affect academic performance of students. Whereas teachers are directly responsible for teaching in the classroom, school administrators are charged with development of organizations that facilitates teaching and learning.

On top of this, students themselves are the most important inputs to the education process. It can be expressed in terms of learners' prior knowledge, motivation and interest towards learning. Students' success or failure in school is a matter of personal responsibility. The time spent for attending classes, reading reference materials and the effort exerted by students towards learning influence students' academic performance in schools. Moreover, motivation is an important factor that influences the performance of students in school. Inherent motivation for students to follow assignments and activities leads to students' academic success. Students with higher intrinsic motivation could read more than students with lower motivation (Rezabeek, 1995). Prior academic achievement as measured by high school GPA is a significant predictor of student success or failure in higher education (Jonassen and Grabowski, 1993; Adem Kedir, 2002).

Studies by Heneveld and Craig (1996) indicate that the common school factors that affect academic performance of students include school supplies (textbooks, reference materials, libraries, laboratories); curriculum with appropriate school and sequence of content, relevance to students' experience; learning time, learning methods; involvement of community and parents, professionalization of teaching (principal's leadership, commitment and level of education and supervision); and school decentralization.

2.2.2 Impact of socio-economic and cultural factors

Socioeconomic status in relation to student's school achievement refers to parents and family. Socioeconomic status is explained by their achievement in education (level of education of parents), employment, and occupational status. Most studies revealed that particularly at primary level, children from low socioeconomics status families are more likely to have:

- low level of literacy, numeracy and comprehension;
- lower retention rates;
- lower education participation rates (children from low socio-economic status families are less likely to attend university);
- difficulties with their studies and display negative attitude to schools.

With regard to the importance of family socioeconomic status, a study made in the United States of America suggest that family Socioeconomic status are more important for students achievement than school variables such as teachers' qualification or expenditure on books, although, its influence decreases as the level of education increases particularly at secondary and tertiary level. Ekstrom, et al. (1986) found that high school dropouts are directly related to the socioeconomic status and ethnicity. Young female students were highly influenced by their mother's education level and male students by their father's level of education. Schiefelbin and Simmons (1981) confirmed that students from high socioeconomic status families are affected less in their achievement.

Moreover, Fuller (1987) suggested, "School as an institution exerts a great influence on achievement within developing countries compared to industrialized nations, after accounting for the effect of pupil's background". The school factors identified were school expenditure, specific material inputs, and teacher quality, teaching practices, classroom organization and school management.

2.2.3 Impact of availability of library services

A school library is another instructional resource that may significantly affect student achievement. According to Ukeje (1992), one of the basic crucial services that should be provided in any educational institution is a school library service. That is, every school whether primary, secondary or tertiary should provide adequate books and other reference materials which are appropriate to the age and education level of the students. The major role of library is to satisfy the ever-growing needs of the users and specifically that of students and instructors. Smith et al. (1966) asserted that, the library serves three major classes of patrons; students, instructors and the public itself. Thus, to serve the users properly, it should be designed in away to stimulate reading for pleasure and for study. So, it should have adequate materials that are suited to the reading abilities, interests and age levels of the students.

It has been explained that, adequate availability of library service is one of the instructional resources that significantly affect students' achievement. Similarly, some research findings reveal that, the presence or absence of pertinent college (school) facilities in a library service contributes to the appearance of substantial differences in students' performance. For instance, a result obtained from a study by International Educational Achievement (IEA) in seven Latin American countries indicates that the number of books on loan from a school library was significantly and positively related to student achievement levels. Students who reported that they used the library more frequently performed better than those who used them less frequently (Fuller, 1987). Adequate availability of library service in college, contributes a lot for enhancing the effective and efficient attainment of the desired learning outcome.

Moreover, as Heyneman and Loxley (1983), reported that, the simple presence of a school library was related to the schools average achievement level in Elsalvador, Botswana and Uganda. School library service is one of the facilities that contribute to the effective attainment of quality education. Likewise Smith et al. (1966), argue that, the

library whether it is located in elementary, secondary and tertiary level, provides materials for students as well as for teachers that help them to develop and promote reading interests, encourage research and study.

2.2.4 Effect of teachers

Teachers are the most important input in school and indispensable actors in the teaching - learning process. Therefore, the quality of teachers has a direct impact on the academic achievement of a student in school. In relation to this, Psacharopoulos and Woodhall (1995), after examining thirty-two studies reported that "Trained teachers do make a difference and in particular that teacher qualification, experience and amount of education and knowledge are positively related to student achievement"

A study conducted in Colombia by the National Center for Education Statistics (1991) contends that seniority of the teacher, teachers' motivation, teachers' educational level, and female teachers have a positive relation to student academic achievement (Jimenez and Pinszon, 1999).

The strength of an educational system most often is determined by the quality and quantity of teachers assigned and student achievement and success is partly the reflection of teachers in the school. As far as the influence of teachers' quality in student achievements concerned, Jimenez and Pinszon (1999) asserted that "states interested in improving their achievement may be well advised, at least in part, to the preparation and qualification of teacher they hire and retain in the profession". It is evidenced that student learning would be enhanced by the effort of teachers, who are more knowledgeable in their field and are skillful in teaching. The long years experience showed that changes in curriculum, testing or textbooks make little difference if teachers do not know how to use these materials. Thus, much of the educational outcomes of students depend on teachers' pedagogical skills, subject mater knowledge, and perception of their job, certification and training. On top of this, teachers' belief, expectation and attitude about their students

have a tremendous impact on students' learning and achievement. More experience and training does not, in itself, assure effective teaching, but opportunities for staff to periodically upgrade their training appear to be critical (Boyer, 1983; Spady, 1976). Spady (1976) argues that state policy initiatives, such as holding schools accountable for student performance on state tests, were effective in getting teachers' attention. Yet policy alone failed to change the core of teaching practice. The most effective way to do this is to encourage teachers to learn about the reforms and to share ideas and teaching strategies both with each other and with experts.

CHAPTER THREE
METHODOLOGY

In this chapter methods and procedures of sampling and data collection are discussed. The variables to be included in the study are described. Variable coding and designation, and methods of data analysis are also discussed.

3.1. Description of the study area

The study had been undertaken in BahirDar University, Ethiopia. The University is located in BahirDar town, the capital city of the Amhara regional state. At the time of data collection, the University had five faculties: Education, Business and Economics, Technology, Agriculture and Law. This study considers only the Business and Economics Faculty of the University. The particular study population is third year students of the Faculty since they stayed long in the learning process. All of these students had equal chance to participate in the study.

3.2. Variables of the study

The way variables are specified and how accurately they are measured influence the interpretation of the results. Therefore, definitions / specifications and/or designations of the variables are given below.

3.2.1. The dependent variable

The response/dependent variable to be measured in the study is the cumulative GPA of the students including the five semesters of the academic years from 2004/2005 to 2006/2007 except the last (6^{th}) semester which is the final semester of their final year of study in the faculty.

3.2.2. Explanatory variables

The explanatory variables of the study that were selected based on the related literature and some preliminary analysis include those factors that can affect student's academic achievement/performance. These variables are given in Table 3.1.

Table 3.1 Explanatory variables included in the study

Explanatory variable	Description	Value labels
X_1	Sex	0= male 1= female
X_2	Age of the students in years	
X_3	Rural or urban background	0= urban 1= rural
X_4	Mother's educational level	0= illiterate 1= primary education complete 2= high school complete 3= graduate from college/university
X_5	Father's educational level	0= illiterate 1= primary education complete 2= high school complete 3= graduate from college/university

X_6	Who raised you?	0=Mother and Father 1=Brother and/or Sister 2=Father only 3=Mother only 4=Others
X_7	Parental income per month (in Birr)	0= <200 1= 201-500 2= 501-1000 3= 1001-1500 4= >1500
X_8	Number of family members who ever joined higher institutions	
X_9	EHEEQE GPA	
X_{10}	Is this department your first choice?	0= Yes, 1= No
X_{11}	What do you study for exam?	0= lecture notes only 1=Books only 2= lecture notes, books and other materials
X_{12}	Where do you study most of the time?	0=dormitory 1= library 2= other places
X_{13}	How do you study most of the time?	0= by attempting to memorize 1= producing short notes and attempting to memorize 2=other
X_{14}	Do you study alone or in group?	0= alone 1= in group

X_{15}	How many hours, on average, do you study in a day?	
X_{16}	When do you start reading for exams?	0= from the date of exam schedule or proclaimed 1= at the beginning of the classes or some weeks after the classes began
X_{17}	For what purpose do you study most of the time?	0= to pass exams only 1= for general knowledge and to pass exams
X_{18}	Frustration caused by fear of academic dismissal?	0= if frustrated 1= otherwise
X_{19}	Textbook/module available?	0= if provided for at least one course 1= if not provided for all courses
X_{20}	Lack of sufficient reference materials in the library	0=Agree 1=Disagree 2=Undecided
X_{21}	There is lack of smooth interpersonal relationship between teachers and students in the teaching learning process	0=Agree 1=Disagree 2=Undecided
X_{22}	Most teachers help both male and female students equally in their respective courses	0=Agree 1=Disagree 2=Undecided
X_{23}	There is adequate library service in relation to working hours and utility of the available materials	0=Agree 1=Disagree 2=Undecided

3.3. Sample design/procedures

The scientific procedures of selecting the sampling units that would provide the required estimators with the associated margins of uncertainty, arising from examining only a part not the whole of the population, are sampling methods. Stratified random sampling, which is applied in this study, is one method of sampling. It is a technique, which uses any relevant information, in order to increase efficiency and it involves in the division or stratification of a population by partitioning the sampling frame into non-overlapping and relatively homogenous groups. Thus, the main purpose of stratification is to reduce the possible sampling errors that can occur in sampling processes.

To sample the respondents from the population, a list of students obtained from the registrar office of the university was used as the sampling frame of the study, and then stratified the study population into departments and determine the sample size from each stratum. Then, respondents have been selected from each stratum by simple random sampling technique.

Since the Faculty has three departments, there are three strata:

Stratum1: Accounting department students with population size N_1 and sample size n_1.
Stratum 2: Economics department students with population size N_2 and sample size n_2.
Stratum 3: Management department students with population size N_3 and sample size n_3.

Let $N= N_1 + N_2 + N_3$ be the total number of students in the faculty at the time of data collection (where $N = 520$, $N_1 =127$, $N_2 = 194$, $N_3 = 199$) and $n= n_1 + n_2 + n_3$ be the total sample size of students who participated in the study. In order to provide a valid estimate of an unknown value along with a measure of its reliability, a probability sample must be

used and thus probability was attained through some mechanical operation of randomization. Since the sample size was too large a table of random numbers was used to select those participants in the study from each stratum.

3.3.1 Sample size determination

In the planning of a sample survey, a stage is always reached at which a decision must be made about the size of the sample. Too large a sample (compared to increase in precision) implies a waste of resources, and too small a sample diminishes the utility of the results as it fails to be representative of the population. Therefore, the decision about the size of the sample should be made in such a way that it does not lead to a waste of resources and the results that are obtained from the sample will explain the population characteristics with a high probability.

The sample size, n, is obtained by $n = \dfrac{n_0}{1+\dfrac{n_0}{N}}$

where N is population size and $n_0 = \dfrac{Z_\alpha{}^2 S^2}{d^2}$

and Z_α is α -percentile of the standard normal distribution. Suppose we choose α=0.05, then $Z_{\alpha/2} = Z_{0.025}$ =1.96. Let the maximum allowable difference between the maximum likelihood estimate $\bar{y}$ (sample mean) and the unknown population parameter (population mean), denoted by d, be 0.036. The smaller the specification of d the better the precision. There are four methods of estimating the population variance S^2 for sample size determination:

1) by taking the sample in two steps, the first being a simple random sample of size n_1 from which estimate s_1^2 (sample variance) of $S^2$and the required n will be obtained;
2) by using the results of a pilot survey;
3) by using results of previous sampling of the same or similar population; and
4) by guesswork about the structure/nature of the population.

To estimate/determine S^2 in this study the results of previous sampling of the same or similar populations was used. A study which was undertaken by Abera Regassa (1999) at Kotebe College of Teachers Education entitled "A study of some selected factors affecting the academic performance of students" has shown that the variation within students ESLCE GPA was 0.0625 (i.e. $S^2=0.0625$). Thus, for the determination of the sample size S^2 was taken to be 0.0625.

Hence, $n_0 = \frac{Z_{0.025}{}^2 S^2}{d^2}$

$$= \frac{(1.96)^2(0.0625)}{(0.036)^2}$$

$$= 184.2$$

This implies that n_0 is approximately 184.

Since $\frac{n_0}{N} = \frac{184}{520} = 0.354 > 0.05$, $n = \frac{184}{1+\frac{184}{520}} = 135.9$

Thus, the sample size for the study is approximately n=136.

In stratified random sampling, after partitioning the population into strata the next step is to make the decision on the allocation of the sample to strata. The best allocation method

is the one that will result in reasonable balance between precision and resources. The most commonly used methods of sample allocation include: equal allocation, proportional allocation, and optimum allocation. But, when the size of the stratum, N_h, is the only available information and there is difference in size among strata, the recommended sample allocation method would be proportional allocation. In proportional allocation, the sample allocated to each stratum is proportional to the total number of units in the stratum. That is, $n_h \alpha N_h$ and from this we obtain the relation $n_h = \frac{n}{N} N_h = fN_h$ where $f = \frac{n}{N}$ is sampling fraction.

Thus , $n_1 = (\frac{n}{N})N_1 = (\frac{136}{520})127 = 33.22 \approx 33$

$n_2 = (\frac{n}{N})N_2 = (\frac{136}{520})194 = 50.74 \approx 51$

$n_3 = (\frac{n}{N})N_3 = (\frac{136}{520})199 = 52.05 \approx 52$

This results in a sample of size 33 from students of Accounting, 51 from students of Economics, and 52 from students of Management department. Then students were selected by using simple random sampling.

3.3.2 Method of data collection

The questionnaire was a preferable method of data collection for this study since privacy can easily be maintained, and also that distortion of the interviewer and peers can be avoided.

During the data collection process, respondents were seated in rows in a hall as if they were in the examination. A brief orientation on the purpose of the study and how to respond to the questions in the questionnaire was given by the researcher. They were also

told that individual respondents would not be identified as confidentiality was guaranteed. After students have completed/filled the forms, they put the questionnaire in a box that was prepared for this purpose.

3.4. Methods of data analysis

The utilization of different methods of data analysis provides extra and more useful information about the consistency and reliability of many specific findings. To show the general feature of the data about each variable, descriptive statistics like the mean, standard deviation and coefficient of variation of each variable were calculated. Chi-square tests were also performed in the preliminary analysis. The investigation of the relationships of the explanatory variables either among themselves or with the criterion variable was performed using correlation analysis.

The combined effect of the explanatory variables on the response variable was examined using multiple regression analysis. A regression equation was fitted for all observations and stepwise regression analysis was employed to determine the best predictors of the response variable (i.e. to select the most important factors affecting the academic performance of the students).

Residual analysis was performed to check the validation of the model assumptions. Plots of residuals against predicted values were examined for checking whether the error terms have constant variance and normal probability plot to check the normality of the random terms. To examine the presence of outliers in the data set an outlier test was performed. The test statistic is the externally studentized residual (called deleted studentized residual in SPSS). If there is a deleted studentized residual value (in magnitude), for any case, larger than the critical value from table of critical values for outlier test (Table E in Weisberg, 1985), then this case will be an outlier. Otherwise, there is no outlier.

3.5 Multiple regression model

A multiple regression model is used to study the relationships between measurable variables that are called response and explanatory variables.

To describe the relationships between the response variable Y and the explanatory variables $X_1, X_2, X_3,\ldots,X_k$ through multiple regression models we use the model given by

$$Y= \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots + \beta_k X_k + \varepsilon$$

where ε is the random vector of error terms of dimension n, β_i , i=0,1,2,...., k are unknown but fixed parameters (called regression coefficients) that need to be estimated. β_0 is the intercept and each β_i , i = 1,2,....., k measures the expected change in the response variable Y per unit change in X_i when all X_j , $j \neq i$, are kept constant.

The basic assumptions for the model are

1. the expectation of the error term ε is zero. i.e. $E(\varepsilon_i) = 0$; i=1,...., n
2. the variance of the error term ε is constant. i.e. $V(\varepsilon_i) = \sigma^2$; i=1,...., n
3. the errors are not correlated.

Under such assumptions, the least squares procedure is the usual method used to estimate these unknown parameters (i.e. the coefficients of the linear regression model are estimated under these assumptions).

We require an additional assumption that each ε_j is normal to make inferences, but not necessarily for least squares fitting of the regression model.

3.5.1 Estimation of parameters

We observe that if Y_j denotes the j^{th} observed response, j = 1, 2,..., *n* (where *n* is number of observations) and X_{ij} denotes the j^{th} level of the i^{th} explanatory variable, then the above model can also be written as

$$Y_j = \beta_0 + \beta_1 X_{1j} + \beta_2 X_{2j} + \ldots\ldots + \beta_k X_{kj} + \varepsilon_j$$

$$= \beta_0 + \sum_{i=1}^{k} \beta_i X_{ij} + \varepsilon_j \quad ; \quad j = 1, 2 \ldots n$$

The well known least squares estimator of $\boldsymbol{\beta}$ is $\hat{\beta} = (\mathbf{X'X})^{-1}\mathbf{X'}Y$

3.5.2 Testing the significance of the model

After fitting a linear regression model by estimating the regression coefficients, we have to test whether the regression coefficients are statistically significant or not. This can be done either by testing the overall significance of the model and by testing the significance of the individual regression coefficients.

The test about the overall significance of the model uses the F-test. It tests whether at least one of the coefficients is significantly different from zero or not (i.e. testing whether or not there is a relationship between the dependent variable and the independent variables).

That is testing the hypotheses

H_0: The hypothetical model doesn't fit the data

H_1: The hypothetical model fits the data

The test statistics is $F = \frac{MSR}{MSE} = \frac{SSR/k}{SSE/(n-k-1)}$

where $SSR = \sum_{i=1}^{k} \hat{\beta}_i S_{iy}$ and $SSE = \sum_{j=1}^{n} \left(Y_j - \hat{Y}_j\right)^2$

$$= S_{yy} - \sum_{i=1}^{k} \hat{\beta}_i S_{iy}$$

$$= \sum_{j=1}^{n} Y_j^{\,2} - \frac{\left(\sum_{j=1}^{n} Y_j\right)^2}{n} - \sum_{i=1}^{k} \hat{\beta}_i S_{iy}$$

where $S_{yy} = \sum_{j=1}^{n} Y_j^{\,2} - \frac{\left(\sum_{j=1}^{n} Y_j\right)^2}{n}$

$$S_{iy} = \sum_{j=1}^{n} Y_j(X_{ij} - \overline{X}_i) = \sum_{j=1}^{n} Y_j X_{ij} - \frac{\left(\sum_{j=1}^{n} Y_j\right)\left(\sum_{j=1}^{n} X_{ij}\right)}{n} \quad i = 1,2,\ldots, k$$

The test rule is to reject H_0 if the calculated value of F, $F_{cal} > F_{k,n-k-1}(\alpha)$, implying that the model must be abandoned and attempts must be made to find a more appropriate model. But, if H_0 is not rejected, then there is no apparent reason to doubt the adequacy of the model.

The test about individual coefficients uses the *t*-test and tests whether each independent variable is statistically significant in determining the dependent variable.
The null and alternative hypotheses in the test about individual coefficients are given by

$H_0 : \beta_i = 0$ versus $H_1: \beta_i \neq 0 \quad i = 1, 2, \ldots, k.$

The test statistic for testing the significance of individual coefficients is given by

$$t = \frac{\hat{\beta}_i}{SE(\hat{\beta}_i)}$$

where $\hat{\beta}_i$ is the estimated value of β_i and $SE(\hat{\beta}_i)$ is the standard error of $\hat{\beta}_i$.

If the calculated t-value, $t_{cal} > t_{n-k-1}(\alpha)$, we conclude that the null hypothesis is rejected and the coefficient is statistically significant.

In addition to testing the significance of the coefficients we have to check or test whether the assumptions of the ordinary least squares are fulfilled.

We must check for constant variance. This is done by plotting residuals against the fitted values. If there is a pattern (trend), we opt for appropriate solutions.

When two or more independent variables are highly correlated with each other, the regression model specified is unable to separate the effect of each individual variable on the dependent variable. When such a problem exists, estimates of the parameters have larger standard errors and the regression coefficients tend to be unreliable. In this case we check for multicollinearity.

The other assumption to check for is the normality of the random terms and the values of the dependent variable. If the normal probability plot follows an approximate straight line that passes through the origin, we conclude that the assumption is met (Draper and Smith, 1981).

3.5.3 Model selection

In a situation where there are many predictors, it is a must to use model selection procedures to obtain a model that uses a subset of the original predictor variables. In different statistical analysis methods there is a problem of identifying subsets of

independent variables that are good predictors of the dependent variable. We encounter this problem in multiple regression analysis.

In model building, it is good to examine several possible models that contain many independent variables and from among them choose a subset on the basis of subject matter knowledge and the principle of parsimony. A statistical software like SPSS uses either backward elimination or stepwise model selection procedures to obtain an optimum regression model.

In backward elimination we start with a model that contains all the predictors and we systematically remove variables with the largest non-significant p-value until we are left with a subset that consists of statistically significant terms. This procedure usually returns useful models, or at least gives a good starting place.

On the other hand, stepwise selection starts with no predictors in the model and examines each term that could possibly be added and then adds the most significant predictor, or the predictor with the smallest p-value. In the next stage the procedure adds the next most significant term and checks to see if any of the previous terms are now non-significant and removes them if they are not significant. This procedure continues until there are no further significant terms to be added. So, unlike backward elimination, this procedure builds the model by adding terms.

Stepwise methods do not necessarily identify "best models" at all as they work by fitting an automated model to the current data set, raising the danger of over-fitting to noise in the particular data set at hand. Mostly, the final model is the last step model, where adding another variable would not improve the model significantly (Marija, 1993).

CHAPTER FOUR
DATA ANALYSIS AND RESULTS

The variables under investigation were analyzed with SPSS computer program for windows version 13.0. Statistical tests for significance were carried out wherever appropriate at a significance level of 5%.

4.1 The preliminary analysis

4.1.1 Chi-square tests

The chi-square test, based on Pearson's chi-square statistic, serves as a preliminary insight for the association/relationship between all selected independent variables and the dependent variable. For all independent variables taking one-at-a-time, a test of association was carried out using the Pearson's chi-square. A high value of Pearson's chi-square for a given independent variable indicates that there is strong association between that independent variable and a dependent variable keeping the effect of the other variables constant. That is testing the hypothesis

H_0: There is no association between the variables
H_1: There is an association between the dependent and a particular independent variable.

The decision was based on the chi-square value, P-value and at 0.05 level of significance.

Since the chi-square test is used for categorical data, in order to apply the test the continuous variables that are included in the study were categorized as shown in Table 4.1.

The performance of students was categorized into three academic performance groups (below satisfactory, satisfactory and above satisfactory). Students with CGPA less than 2.25 were categorized into the "below satisfactory" group, those with CGPA 2.25–2.75

including both 2.25 and 2.75 were categorized into the "satisfactory" group while those with CGPA larger than 2.75 were categorized into the "above satisfactory" group. The other continuous variables were also coded as shown in Table 4.1.

Table 4.1 Categorized continuous variables

Variable	Description	Value labels
Y	Academic performance (CGPA)	0 = < 2.25 1 = 2.25-2.75 2 = >2.75
X2	Age of the students in years	0 = <21 1 = 21-22 2 = >22
X8	Number of family members who ever joined higher institutions	0 = <2 1 = 2-5 2 = >5
X9	EHEEQE GPA	0 = <210 1 = 210-260 2 = 261-300 3 = >300
X15	How many hours, on average, do you study in a day?	0 = 0-3 1 = 4-6 2 = 7-10 3 = >10

Table 4.2 Chi-square test between the response variable and the explanatory variables

Variable	Chi-square value	df	Significance
X1	6.372	2	0.041
X2	8.241	4	0.083
X3	0.577	2	0.749
X4	5.665	6	0.462
X5	4.205	6	0.649
X6	15.247	8	0.055
X7	5.92	8	0.656
X8	1.247	4	0.87
X9	37.042	6	0.00
X10	5.533	2	0.062
X11	8.006	4	0.091
X12	3.606	4	0.462
X13	0.060	2	0.970
X14	7.063	2	0.029
X15	3.896	6	0.691
X16	0.039	2	0.981
X17	8.397	2	0.015
X18	20.717	4	0.00
X19	1.977	4	0.740
X20	1.199	4	0.878
X21	5.737	4	0.220
X22	6.506	4	0.164
X23	2.512	4	0.642

From the results given in Table 4.2, X1 (Sex), X9 (EHEEQE GPA), X14 (Do you study alone or in group?), X17 (For what purpose do you study most of the time?), and X18 (Frustration caused by fear of academic dismissal) are significantly associated with student's academic performance. The remaining variables are not significantly associated with student's academic performance. Of the significantly associated variables, EHEEQE GPA and frustration caused by fear of academic dismissal are highly significant.

4.1.2 Descriptive measures

The means, standard deviations, and coefficient of variations of the dependent variable, and the dichotomous and continuous independent variables are presented in Table 4.3. The percentage distribution of respondents on the basis of each variable with respect to the three academic performance groups is also shown in Table 4.4.

Table 4.3 Mean, Standard deviation and Coefficient of variation

Variable	Mean	Standard deviation	Coefficient of variation
Y	2.57	0.41	0.12
X1	0.21	0.41	1.95
X2	21.65	1.49	0.07
X3	0.36	0.48	1.33
X8	1.84	1.89	1.03
X9	249.28	48.01	0.19
X10	0.34	0.48	1.41
X14	0.19	0.40	2.11
X15	6.56	3.03	0.46
X16	0.65	0.48	0.74
X17	0.57	0.50	0.88
X18	0.52	0.62	1.19
X19	0.20	0.48	2.4

As it can be seen from the table, notable variations are observed within the variables X_1 (Sex), X_{14} (Do you study alone or in group?), and X_{19} (Textbook/module available?). These variations are clearly observable when the comparison is made between variables in terms of their coefficient of variations.

The mean corresponding to each dummy variable represents the proportion of cases in the category where the variable attains a value of one. For instance, for the variable X_1 (Sex) the value labels are 0=Male, 1=Female and thus, the proportion of females is 0.21. The same argument can be made for the remaining dummy variables.

The mean corresponding to each continuous variable represents the arithmetic mean of the variable. For example, the mean of the variable X2 (Age) is 21.65 means that the average age of the students is 21.65.
The same argument can be made for the remaining continuous variables.

Table 4.4 The percentage distribution of respondents on each variable with respect to the three academic performance groups.

Explanatory/Independent Variable		Academic performance (CGPA)			Total
		< 2.25	2.25 – 2.75	> 2.75	
X1	Male	40(37.38%)	62(57.94%)	5(4.68%)	107(78.68%)
	Female	18(62.07%)	9(31.03%)	2(6.9%)	29(21.32%)
X2	< 21	7(43.45%)	9(56.25%)	0(0.00%)	16(11.76%)
	21 – 22	38(37.26%)	58(56.86%)	6(5.88%)	102(75.00%)
	> 22	13(72.22%)	4(22.22%)	1(5.56%)	18(25.00%)
X3	Urban	35(40.23%)	48(55.17%)	4(4.59%)	87(63.97%)
	Rural	23(46.94%)	23(46.94%)	3(6.12%)	49(36.03%)
	Illiterate	32(45.71%)	36(51.43%)	2(2.86%)	70(51.47%)

X4	Primary education complete	18(46.15%)	19(48.72%)	2(5.13%)	39(28.68%)
	High school complete	3(21.43%)	10(71.43%)	1(7.14%)	14(10.29%)
	Graduate	5(38.46%)	6(46.15%)	2(15.38%)	13(9.56%)
X5	Illiterate	20(43.48%)	25(54.35%)	1(2.17%)	46(33.82%)
	Primary education complete	20(45.45%)	21(47.73%)	3(6.82%)	44(32.35%)
	High school complete	8(34.78%)	14(60.87%)	1(4.35%)	23(16.91%)
	Graduate	10(43.48%)	11(47.83%)	2(8.70%)	23(16.91%)
X6	Mother and Father	42(42.42%)	53(53.53%)	4(4.04%)	99(72.79%)
	Brother and Sister	3(50.00%)	1(16.67%)	2(33.33%)	6(4.41%)
	Father only	4(100%)	0(0.00%)	0(0.00%)	4(2.94%)
	Mother only	7(43.75%)	8(50.00%)	1(6.25%)	16(11.76%)
	Others	2(18.18%)	9(81.81%)	0(0.00%)	11(8.09%)
X7	<200	13(44.83%)	16(55.17%)	0(0.00%)	29(21.32%)
	201-500	17(43.59%)	22(56.41%)	0(0.00%)	39(28.68%)
	501-1000	11(34.38%)	17(53.13%)	4(12.50%)	32(23.53%)
	1001-1500	10(43.48%)	10(43.48%)	3(13.04%)	23(16.91%)
	>1500	7(53.85%)	6(4615%)	0(0.00%)	13(9.56%)
X8	< 2	31(43.66%)	36(50.70%)	4(5.63%)	71(52.21%)
	2-5	22(39.29%)	32(57.14%)	2(3.57%)	56(41.18%)
	>5	5(55.56%)	3(33.33%)	1(11.11%)	9(6.62%)
X9	< 210	24(80.00%)	6(20.00%)	0(0.00%)	30(22.06%)
	210-260	23(47.92%)	25(52.08%)	0(0.00%)	48(35.29%)
	261-300	9(21.43%)	31(73.81%)	2(4.76%)	42(30.88%)
	>300	2(13.33%)	8(53.33%)	5(33.33%)	15(11.03%)
X10	Yes	32(35.56%)	54(60.00%)	4(4.44%)	90(66.18%)
	No	26(56.52%)	17(36.96%)	3(6.52%)	46(33.82%)

X11	Lecture notes only	16(50.00%)	15(46.88%)	1(3.12%)	32(23.53%)
	Books only	6(85.71%)	1(14.29%)	0(0.00%)	7(5.15%)
	Lecture notes, books and others	36(37.11%)	55(56.70%)	6(6.19%)	97(71.32%)
X12	Dormitory	25(46.29%)	28(51.85%)	1(1.85%)	54(39.71%)
	Library	26(38.81%)	36(53.73%)	5(7.46%)	67(49.26%)
	Other	7(46.67%)	7(46.67%)	1(6.67%)	15(11.03%)
X13	Memorize	12(37.50%)	17(53.13%)	3(9.38%)	32(23.53%)
	Producing short notes and memorize	35(38.89%)	51(56.67%)	4(4.44%)	90(66.18%)
	Other	11(78.57%)	3(21.43%)	0(0.00%)	14(10.29%)
X14	Alone	41(37.27%)	63(57.27%)	6(5.45%)	110(80.88%)
	In group	17(65.38%)	8(30.77%)	1(3.85%)	26(19.12%)
X15	0-3	9(60.00%)	6(40.00%)	0(0.00%)	15(11.03%)
	4-6	26(36.62%)	40(56.34%)	5(7.04%)	71(52.21%)
	7-10	18(43.90%)	20(48.78%)	2(4.88%)	41(30.15%)
	>10	5(55.56%)	4(44.44%)	0(0.00%)	9(6.62%)
X16	From the date of exam schedule or proclaimed	21(43.75%)	25(52.08%)	2(4.17%)	48(35.29%)
	At the beginning of the classes or some weeks after the classes began	37(42.05%)	46(52.27%)	5(5.68%)	88(64.71%)
X17	To pass exam only	33(56.89%)	23(39.66%)	2(3.45%)	58(42.65%)
	For general knowledge and to pass exam	25(32.05%)	48(61.54%)	5(6.41%)	78(57.35%)
X18	Frustrated	38(45.78%)	39(46.99%)	6(7.23%)	83(61.03%)

	Not frustrated	20(37.74%)	32(60.38%)	1(1.89%)	53(38.97%)
X19	Provided for at least one course	46(40.35%)	62(54.39%)	6(5.26%)	114(83.82%)
	Otherwise	12(54.55%)	9(40.91%)	1(4.55%)	22(16.18%)
X20	Agree	44(41.12%)	56(52.34%)	7(6.54%)	107(78.68%)
	Disagree	7(46.67%)	8(53.33%)	0(0.00%)	15(11.03%)
	Undecided	7(50.00%)	7(50.00%)	0(0.00%)	14(10.29%)
X21	Agree	37(37.37%)	56(56.57%)	7(7.07%)	99(72.79%)
	Disagree	15(62.50%)	9(37.50%)	0(0.00%)	24(17.65%)
	Undecided	6(46.15%)	7(53.85%)	0(0.00%)	13(9.56%)
X22	Agree	20(40.82%)	24(48.98%)	5(10.20%)	49(36.03%)
	Disagree	34(45.95%)	38(51.35%)	2(2.70%)	74(54.41%)
	Undecided	4(30.77%)	9(69.23%)	0(0.00%)	13(9.56%)
X23	Agree	29(48.33%)	27(45.00%)	4(6.67%)	60(44.12%)
	Disagree	23(38.33%)	34(56.67%)	3(5.00%)	60(44.12%)
	Undecided	6(37.50%)	10(62.50%)	0(0.00%)	16(11.76%)

Table 4.4 shows most of the students (78.68%) were male and 21.32% were female. But most (62.07%) of the female students belong to the "below satisfactory" academic performance group. More than half of the students had illiterate mothers and only 9.56% of the students had college/university graduate mothers.

Most of the students (72.79%) were raised by both mother and father. Though they were very few (only 2.94%), all of the students who were raised only by their father belong to the "below satisfactory" academic performance group.

Only 11.03% of the students had EHEEQE GPA greater than 300 and 33.33% of these students belong to the "above satisfactory" academic performance group. 22.06% (twice the students with EHEEQE GPA greater than 300) of the students joined the university

with EHEEQE GPA less than 210, and 80% of these students belong to the "below satisfactory" academic performance group.

About 66.18% of the students were allocated to departments based on their first choice, and more than half of the students who were not allocated to departments based on their first choice belong to the "below satisfactory" academic performance group. Almost half of the students usually study in the library and these students covered 71.43% of the "above satisfactory" academic performance group.

About 42.26% of the students study to pass exams only. More than half and 3.45% of these students belong to the below and "above satisfactory" academic performance group, respectively. Most (80.88%) of the students were not studying in group rather alone and these students covered 85.71% of the "above satisfactory" academic performance group. Among students who were studying in group, 65.38% belong to the "below satisfactory" academic performance group.

Around 61.03% of the students were learning through frustration due to fear of academic dismissal, and nearly half of these students belong to the "below satisfactory" academic performance group whereas 7.23% of them belong to the "above satisfactory" academic performance group.

About 72.79% of the students agreed on the existence of lack of smooth interpersonal relationship between teachers and students in the teaching-learning process.Also, all of the students belonging to the "above satisfactory" academic performance share the same feeling. However, from the students who disagreed the existence of lack of smooth interpersonal relationship between teachers and students in the teaching-learning process 62.50% belong to the "below" and none of them belong to the "above satisfactory" academic performance group.

Majority (78.68%) of the students agreed on the existence of lack of reference materials in the library. More than half of the students (54.41%) believe that most teachers did not help both male and female students equally in their respective courses.

Only few(5.15%) of the students scored a CGPA greater than 2.75 (i.e. only 7 out of 136 students belong to the "above satisfactory" academic performance group).

4.1.3 Intercorrelations among the variables

Bivariate correlation coefficients for the variables under investigation are presented in Table 4.5. Some coefficients are statistically significant at 0.05 level of significance and these significant coefficients are indicated by asterisk (*).

The variables X9 (EHEEQE GPA), X10 (Is this department your first choice?), X14 (Do you study alone or in group?), X17 (For what purpose do you study most of the time?), and X18 (Frustration caused by fear of academic dismissal) were found to be significantly correlated with the academic performance of the students at 0.05 level of significance and from these variables, EHEEQE GPA is positively and highly correlated.

Some explanatory variables were found to be intercorrelated. The highest correlation is observed between mother's education level and father's education level ($r = 0.681$). However, the variables age and father's education level are found to be uncorrelated (i.e. there is no linear relationship between age of the student and father's level of education).

Table 4.5 Bivariate correlation coefficients

	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	X_{16}	X_{17}	X_{18}	X_{19}	X_{20}	X_{21}	X_{22}	X_{23}	Y
X_1	-.072	.021	.044	-.015	.057	-.068	.064	-.235*	.159	-.166	-.074	.092	.249*	.147	.122	-.204*	.054	.083	.051	-.046	-.183	.117	-.166
X2		.103	-.114	.000	.124	-.054	-.131	-.158	.156	-.079	.019	-.181	.038	.007	.025	-.021	.125	.199	.029	-.021	.244*	-.053	-.088
X3			-.239*	-.36*	.053	-.241*	-.18	-.093	.014	.119	.025	.069	-.053	.084	.234*	-.003	-.163	.104	.036	-.118	-.075	-.072	-.067
X4				.681*	-.096	.46*	.297*	.049	-.157	-.05	-.076	-.027	.091	-.11	-.072	-.043	-.029	.124	.133	-.034	.098	.026	.103
X5					-.099	.438*	.341*	.008	-.112	-.008	-.015	-.173	.115	-.124	-.113	-.072	.044	.134	.123	.027	.133	.086	.021
X6						-.211*	-.102	-.041	.013	-.023	.044	-.148	.023	.017	.038	-.009	.066	.066	.070	-.049	-.034	.01	.003
X7							.260*	.250*	-.084	-.111	.092	-.049	.137	-.258*	-.221*	.018	.162	.067	.047	-.003	.116	-.031	.035
X8								-.097	.037	.016	.022	.101	.141	-.064	-.170	-.058	-.060	-.029	.024	-.018	.089	.202*	-.004
X9									-.306*	.142	.042	.076	-.126	-.090	.164	.243*	-.272*	-.218*	-.194	-.107	-.093	-.064	.630*
X10										-.018	.005	.007	-.031	.123	-.025	-.043	.125	.028	.035	.002	.029	.020	-.228*
X11											.115	.089	-.076	.140	.271*	.223*	-.097	-.142	-.074	.081	-.123	.206*	.210*
X12												-.030	-.044	.143	-.042	.100	-.030	.134	-.098	.023	-.042	.040	.054
X13													.143	.090	.110	.078	-.122	-.110	-.017	-.017	-.139	-.063	.015
X14														.059	-.032	-.072	.104	.032	-.035	-.131	.057	.067	-.231*
X15															.200	.096	-.145	.080	.178	-.041	-.031	-.063	-.036
X16																.141	-.223*	-.143	-.067	-.032	-.166	-.081	.055
X17																	-.258*	-.015	.008	-.038	-.032	.005	.268*
X18																		.096	.157	.016	.073	.088	-.388*
X19																			.480*	.119	.126	.039	-.188
X20																				-.031	.043	.066	-.109
X21																					.022	-.064	-.206*
X22																						-.08222	-.123
X23																							.041

4.2 Regression analysis

The main problem with the bi-variate (chi-square) approach is that it ignores the possibility that a collection/combination of variables, each of which could be weakly associated with the outcome variable, can become an important predictor of the outcome when they are taken together. Hence, the multiple linear regression approach that takes into account the above limitation is considered in this analysis.

4.2.1 Variable selection and model building

This study involves twenty-three explanatory variables X1, X2, ..., X23 and a response variable Y. The objective here is to determine (select) the most important subset from these twenty-three explanatory variables and the corresponding "best-fitting" regression model for describing the relationship between Y and the X's.

Stepwise regression analysis was performed to select the most important factors affecting the academic performance of the students. That is, the data under study were subjected to the stepwise regression analysis to select the "best" least squares fit. However, the variables X4 (Mother's educational level) and X5 (Father's educational level) were not entered into the equation since the least squares fit (model) can be seriously affected due to the inclusion of the correlated variables (Cook and Weisberg, 1982).

Multicollinearity is said to exist in the data when two or more explanatory variables are highly correlated. As it can be seen from Table 4.5 the variables X4 and X5 are highly correlated. As it is suggested in Montgomery and Peck (1992) variance inflation factors (VIF) larger than 10 imply serious problems due to the presence of multicollinearity. All of the explanatory variables were entered into the regression equation to check whether the variables satisfy this condition. But collinearity diagnostic result indicated that (see Table 4.6) all variance inflation factors are less than 10 suggesting that the problem of multicollinearity is not serious.

Table 4.6 VIF of the explanatory variables

Variable	VIF
X1	1.403
X2	1.265
X3	1.405
X4	2.200
X5	2.371
X6	1.136
X7	1.959
X8	1.388
X9	1.702
X10	1.212
X11	1.395
X12	1.192
X13	1.229
X14	1.247
X15	1.325
X16	1.391
X17	1.239
X18	1.426
X19	1.632
X20	1.551
X21	1.145
X22	1.204
X23	1.224

The stepwise regression analysis revealed that the variables "EHEEQE GPA", "frustration due to fear of academic dismissal", "lack of smooth interpersonal relationship between teachers and students in the teaching-learning process" and "Do you study alone or in group?" were important predictors of academic performance of the students (i.e.

factors significantly affecting the academic performance of the students). The remaining explanatory variables were found to be non-significant in affecting academic performance of the students.

The results of the stepwise regression analysis are presented in Table 4.7 and Table 4.8.

Under the assumptions of the model, the test for significance of regression is presented in Table 4.8. It is used to test the existence of a linear association between the response variable and any of the explanatory variables (i.e. test about the overall significance of the model). From the table, the test statistics F is 31.933 (i.e. $F_{cal} = 31.933$). The tabulated F value at 0.05 level of significance is $F_{(4,131)}(0.05) = 2.44$ which is the critical value. Therefore, as $31.933 > 2.44$ at least one of the explanatory variables X9, X18, X21 and X14 contributes significantly to the model. That is, there is a linear relationship between the response variable and at least one of these explanatory variables. Moreover, the calculated values of the test statistic for the significance of any individual regression coefficient, i.e. the calculated t-value, are presented in Table 4.7. The tabulated t-value, that is the critical value at 0.05 level of significance, is $t_{131}(0.05) = 1.98$. But from Table 4.7, the magnitude of the test statistic t (i.e. t_{cal}) for each variable is greater than this critical value. Thus, each of these four variables contributes significantly to the model.

Variables in the equation

Variable(s) entered in step 1: EHEEQE GPA
Variable(s) entered in step 2: Frustration due to fear of academic dismissal
Variable(s) entered in step 3: Lack of smooth interpersonal relationship between teachers and students in the teaching-learning process
Variable(s) entered in step 4: Do you study alone or in group?

As it can be observed from Table 4.7, the academic performance (CGPA), Y, of the students as a function of the significant explanatory variables is given by

$$\hat{Y} = 1.591 + 0.005X_9 - 0.148X_{18} - 0.105X_{21} - 0.169X_{14}$$

That is, the most important factors affecting student's academic performance are their EHEEQE GPA, frustration due to fear of academic dismissal, lack of smooth interpersonal relationship between teachers and students in the teaching-learning process and whether a student studies alone or in group. The coefficients indicate that those students who performed better in EHEEQE performed also better in the university. Students who were frustrated due to fear of academic dismissal performed less than those students who were not frustrated. Those students who believed the existence of lack of smooth interpersonal relationship between teachers and students in the teaching-learning process performed less than those students who did not believe such existence. Students who were studying alone performed better than those students who were studying in group.

Table 4.7 Variables in the final model

Variable	Coefficients $\hat{\beta}$	SE of coefficients, SE ($\hat{\beta}$)	t-value	Significance
Constant	1.591	0.153	10.419	0.000
X9	0.005	0.001	8.112	0.000
X18	-0.148	0.043	-3.456	0.001
X21	-0.105	0.040	-2.644	0.009
X14	-0.169	0.066	-2.565	0.011

Table 4.8 ANOVA

Source	df	SS	MS	F
Regression	4	11.128	2.782	31.933
Residual	131	11.413	0.087	
Total	135	22.541		

4.2.2 Residual analysis

In order to use the model for prediction purpose further analyses regarding model adequacy are required (i.e. before applying the fitted model for the designed purpose it has to be assessed for possible inadequacies). Examination of standard summary statistic such as the t- or F- statistic cannot be used to detect departures from model assumptions. Therefore, it is a usual practice that after fitting the model the next step is to check for model adequacy. Checking model adequacy is equivalent to checking if the model assumptions are valid. That is, checking for the assumptions of constant variance, normality and independence of error terms. This can be carried out through residual analysis.

The normal probability plot of residuals is useful to examine whether the error terms are approximately normally distributed. The normal probability plot of standardized residuals is presented in Figure 4.1. As it can be seen from the figure, there is no apparent departure from normality assumption since the plot approximates a straight diagonal line that passes through the origin. Therefore, it is reasonable to assume that the error terms are approximately normally distributed.

The plot of the residuals against the predicted values of the dependent variable, presented in Figure 4.2, is used for assessing the constancy of the variances of the error terms. It supports that the assumption of constant variance of the error terms is acceptable since the plots lie within a horizontal band (there is an identifiable trend).

To examine the presence of outliers in the data set an outlier test was performed. The test statistic is the externally studentized residual (called deleted studentized residual in SPSS). If the error terms are normally distributed, then this test statistic is distributed as student's t-distribution with n-k-1 degree of freedom, where k is the number of explanatory variables included in the model and n is number of observations (Weisberg, 1985). The largest deleted studentized residual value (in magnitude) is 2.849 corresponding to case 76. From the table of critical values for outlier test (Table E in

Weisberg, 1985) with $k = 4$ and $n = 136$, we find the critical value at 0.05 level of significance to be 3.60. Then, since $2.849 < 3.60$, case 76 is not an outlier and so are the other cases.

The partial regression plots of X9, X18, X21 and X14, presented in Figures 4.3 - 4.6 respectively, do not show any apparent deviation from the assumption of linearity. Fig. 4.3 shows that student's academic performance is directly proportional to EHEEQE GPA and Fig.4.6 shows some clustering of the two groups of students: the majority(80.88%) of the students who were studying alone and those who were studying in group.

4.2.3 Multicollinearity

Collinearity diagnostics were carried out to check if there is multicollinearity problem in the data set or if there is linear dependence among the explanatory variables that are included in the model. Table 4.9 presents the variance inflation factor (VIF) of the explanatory variables in the model.

Table 4.9 VIF of the explanatory variables in the final model

Variable	VIF
X9	1.108
X18	1.086
X21	1.034
X14	1.044

If the variance inflation factor (VIF) of at least one explanatory variable that is included in the model is larger than 10, then this is an indication of a serious problem due to the presence of multicollinearity (Montgomery and Peck, 1992). However, all variance inflation factors are less than 10 (Table 4.9) suggesting that the problem of multicollinearity is not serious (i.e. there is no multicollinearity problem).

CHAPTER FIVE

Discussion, Conclusion and Recommendation

As the main objective of the study is to identify the main factors that can affect student's academic performance, twenty-three possible factors that could possibly affect the academic performance of the students considered.

The variables X9 (EHEEQE GPA), X10 (Is this department your first choice?), X14 (Do you study alone or in group?), X17 (For what purpose do you study most of the time?), and X18 (Frustration caused by fear of academic dismissal) were found to be significantly correlated with the academic performance of the students at 0.05 level of significance. The finding that the EHEEQE GPA was positively and highly correlated with the academic performance of the students is consistent with the findings of Habte Tewoldeberhan (1988) and Abera Regassa (1999), who reported that ESLCE GPA was related to the academic performance of the students. Some explanatory variables were found to be intercorrelated. The highest correlation is observed between mother's education level and father's education level ($r = 0.681$). However, the variables age and father's education level are found to be uncorrelated (i.e. there is no linear relationship between age of the student and father's level of education).

Results from the bi-variate analysis by using Pearson's chi-square statistic (Table 4.2) indicated that the variables/factors X1 (Sex), EHEEQE GPA, "Do you study alone or in group?", "For what purpose do you study most of the time?", and "Frustration caused by fear of academic dismissal" are significantly associated with student's academic performance. The remaining explanatory variables are not significantly associated with the academic performance of the students. Of the significantly associated explanatory variables, EHEEQE GPA(positively) and Frustration caused by fear of academic dismissal(negatively) are highly significant.

The bi-variate analysis has shown that the variables Sex, EHEEQE GPA, "Do you study alone or in group?", "For what purpose do you study most of the time?", and "Frustration

caused by fear of academic dismissal" are significantly associated with student's academic performance. However, the multiple regression(stepwise regression) analysis shows that only the four variables EHEEQE GPA, frustration caused by fear of academic dismissal, lack of smooth interpersonal relationship between teachers and students in the teaching-learning process and whether a student studies alone or in group are the significant factors affecting student's academic performance. The remaining nineteen explanatory variables are not significant factors.

The result of the stepwise regression analysis indicated that EHEEQE GPA is the most important predictor of the academic performance of the students.

According to the results of the stepwise regression analysis, those students who performed better in EHEEQE performed also better in higher institutions, because they had strong potential and educational background that help them to easily catch up with learning (studying) styles and exam types in higher institutions. This finding is consistent with the findings of Fentaw Abegaz (2001), Abera Regassa (1999) and Habte Tewoldeberhan (1988). Lower survival rate and low graduation rate of quota admitted students (students with low ESLCE GPAs, and thus admitted through affirmative actions) than regular admission (those students with higher ESLCE GPAs) as indicated by Fentaw Abegaz (2001) supports this finding. In addition, Abera Regassa (1999) and Habte Tewoldeberhan (1988) concluded that ESLCE GPA was one of the best predictor of the academic performance of students.

Frustration caused by fear of academic dismissal is the second best predictor of the student's academic performance. This may be due to lack of confidence, the competitive nature of university life and the like. This finding contradicts the finding of Abera Regassa (1999), who reported that frustration caused by fear of academic dismissal was not significant in affecting student's academic performance.

Lack of smooth interpersonal relationship between teachers and students in the teaching-learning process and whether a student studies alone or in group are the two other

important factors affecting student's academic performance found to be significant in this study, although these had not been considered in the previous studies.

Hence, we can draw the conclusion that the findings of this study support the importance of EHEEQE GPA in determining student's academic performance at higher institutions as indicated in the earlier works. Frustration caused by fear of academic dismissal, lack of smooth interpersonal relationship between teachers and students in the teaching-learning process and whether a student studies alone or in group are identified as other important factors that affect student's academic performance in higher institutions.

These conclusions can be considered as valid since as indicated in the residual analysis the basic assumptions of the model hold.

Finally, the findings of the study lead us to give the following recommendations:

- attention should be given for student's academic performance at high school and/or lower levels;
- creating means which facilitate smooth interpersonal relationship between teachers and students in the teaching-learning process;
- give counseling/consulting support to students to make them understand the competitive nature of higher institution life, what they are capable of doing, and ways/styles of learning/studying.

It is also the researcher's belief that the findings of this study will help as basis for those who are interested in making further research of related topics/issues in higher educational institutions.

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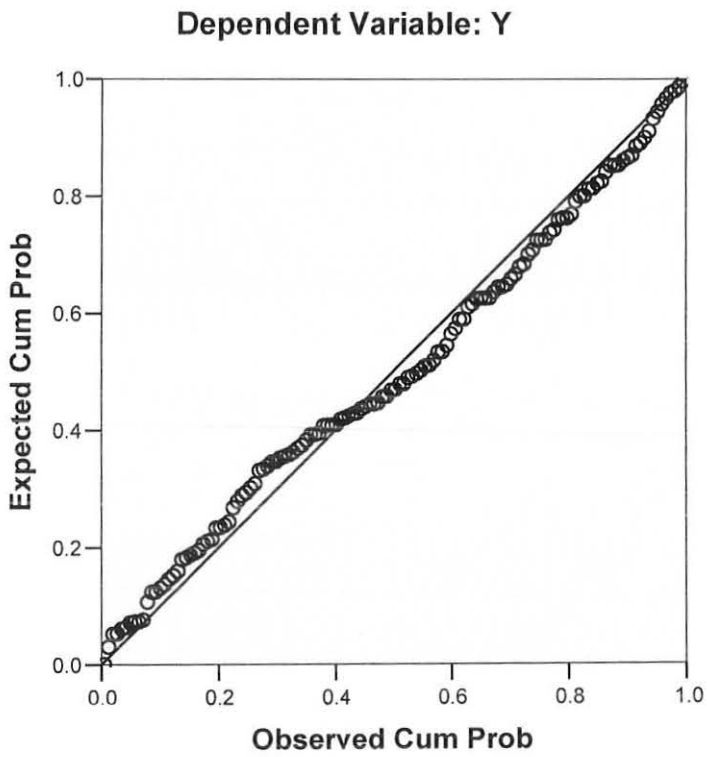

Figure 4.1 Normal probability plot of residual

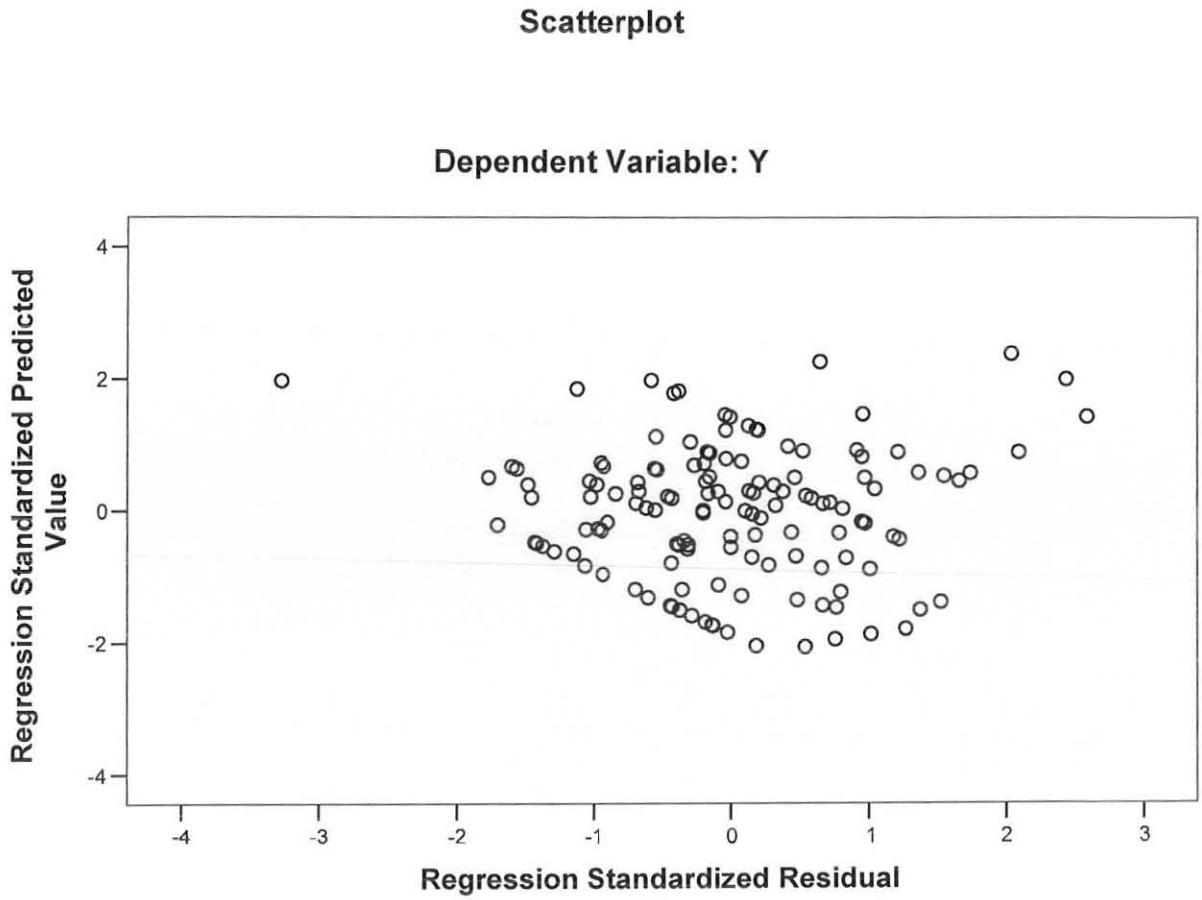

Figure 4.2 plot of residual against predicted value

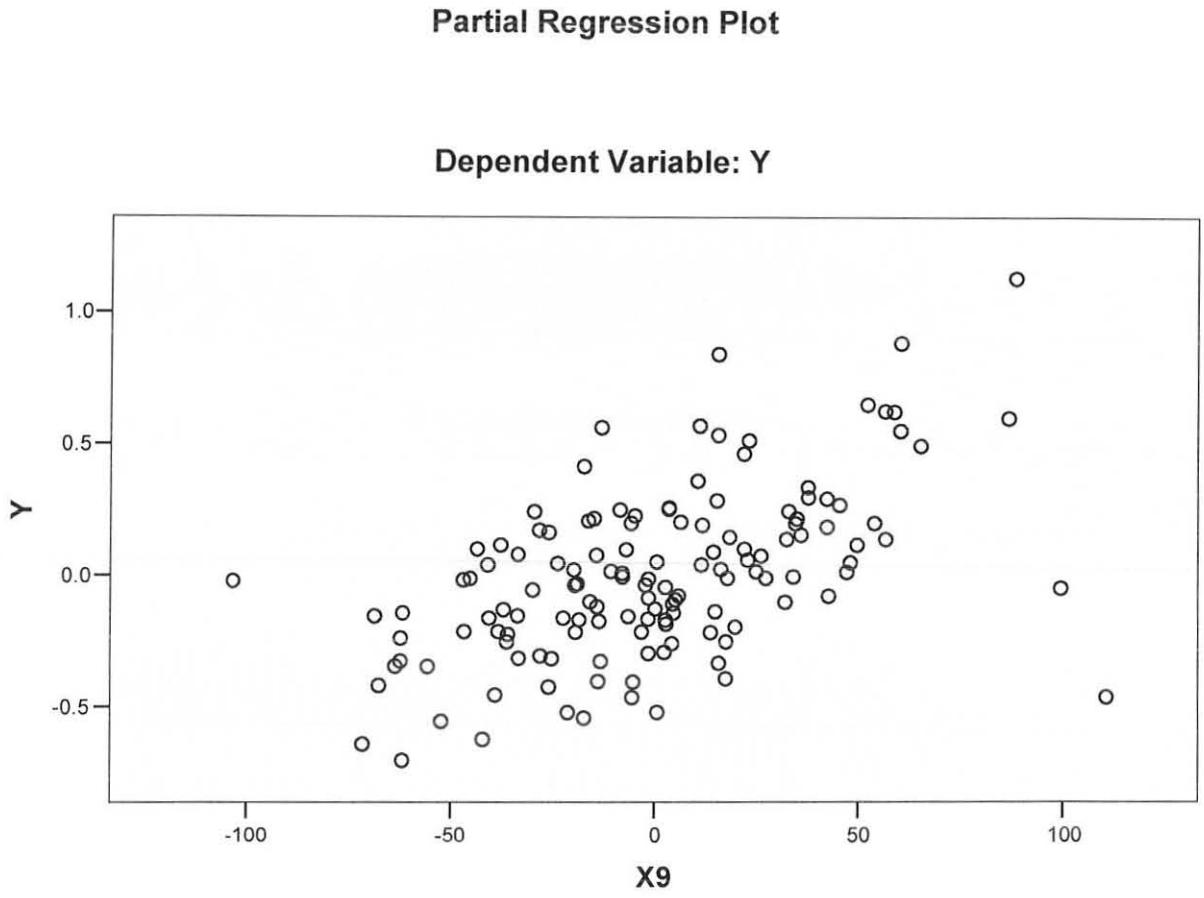

Figure 4.3 Partial regression plot of X9

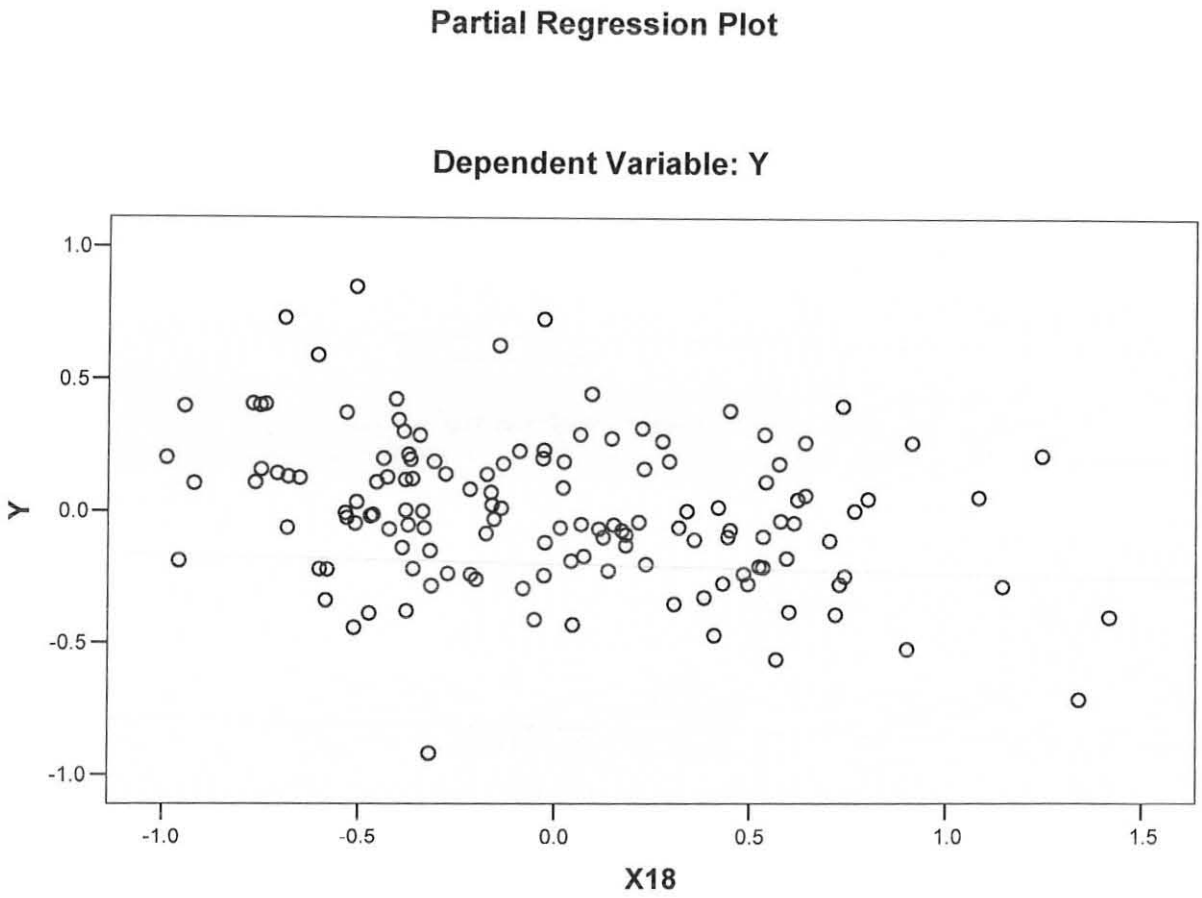

Figure 4.4 Partial regression plot of X18

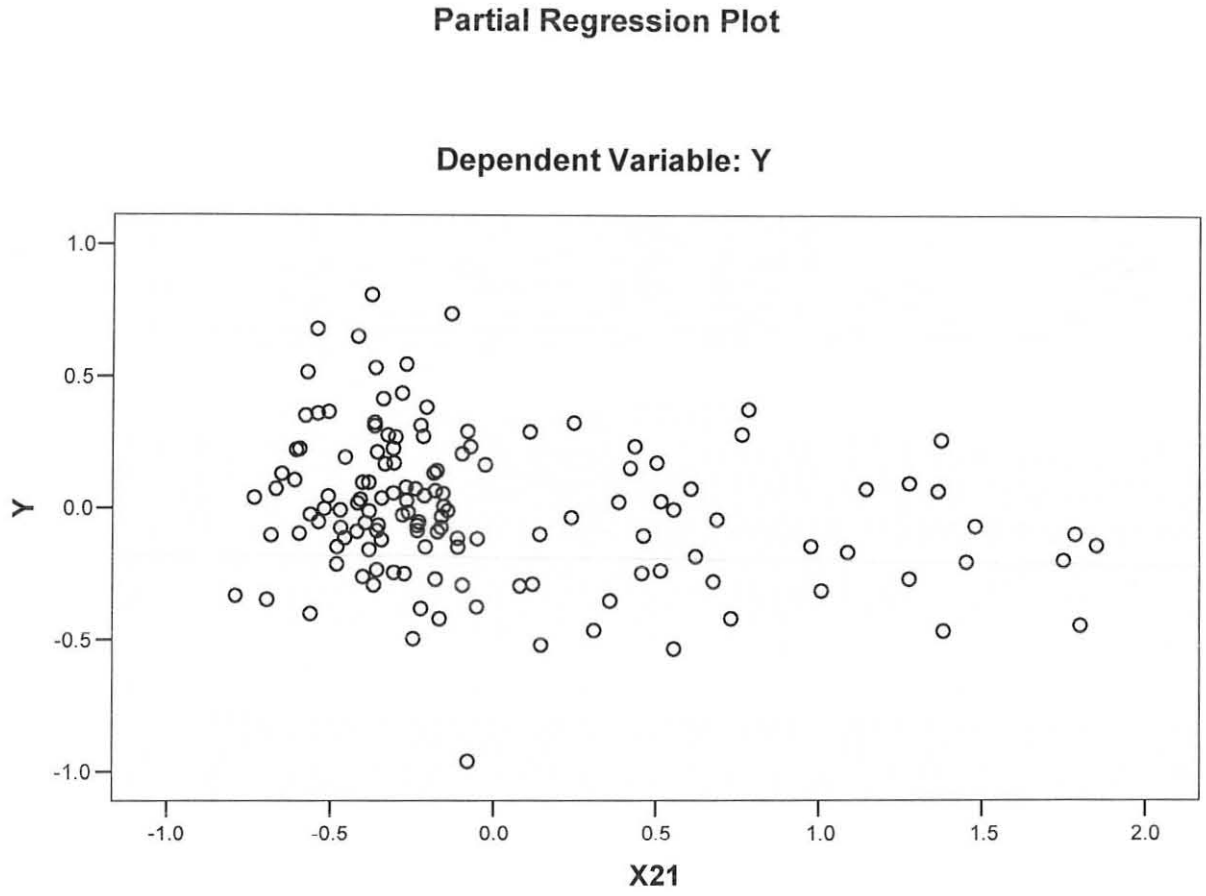

Figure 4.5 Partial regression plot of X21

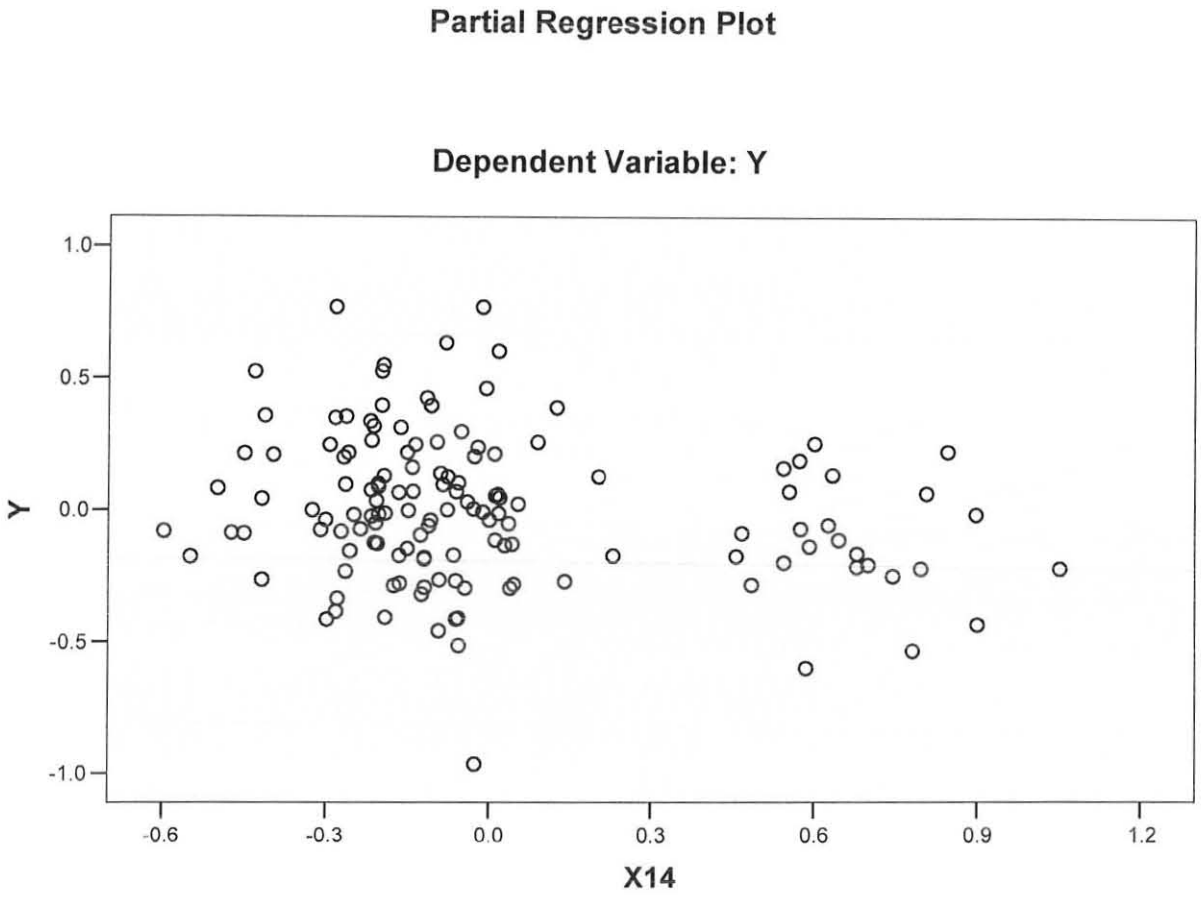

Figure 4.6 Partial regression plot of X14

Addis Ababa University

Faculty of Science

Department of Statistics

The purpose of this questionnaire is to identify (asses) factors that affect the academic performance of students in Bahirdar University. The information given by you is very essential for the successful completion of my study and it will be used for research and teaching purpose only. I, therefore, request you to kindly respond to the questionnaire as accurately and carefully as possible.

Regarding confidentiality, the whole process of questionnaire administration is set up in such away that secrecy is maintained. In addition all your responses will remain confidential and will not affect you in any way. To assure this, you are not expected to write your name and/or identification number (Id.No) any where in the questionnaire. To indicate your response please put "X" mark in the box or write your response for the questions that require written responses on the space provided.

Organization of the Questionnaire

The questionnaire has two sections.
Section I consists of questions on your background information and
Section II consists of questions on your academic situation.

Thank you for your cooperation

Section one: About yourself

1.1 Sex: Male ☐ Female ☐

1.2 How old are you? (Age in years) _____

1.3 Where did usually you live? Urban area ☐ Rural area ☐

1.4 Who raised you?

Mother and Father ☐ Brother and/or Sister ☐

Father only ☐ Mother only ☐

Others _____

1.5 Average monthly income of your parents (salary and other services)

<250 Birr ☐ 251-500 Birr ☐ 501-1000 Birr ☐

1001-1500 Birr ☐ > 1500 Birr ☐

1.6 Education level of your mother

Illiterate ☐ High school complete ☐

Primary education complete ☐ Graduate from college/university ☐

1.7 Education level of your father

Illiterate ☐ High school complete ☐

Primary education complete ☐ Graduate from college/university ☐

1.8 Education level of the person who raised you (If it is other than mother and/or Father)

Illiterate ☐ High school complete ☐

Primary education complete ☐ Graduate from college/university ☐

1.9 From your family members, how many of them have ever joined higher institution?

_____.

Section two: About your academic situation

2.1 Your Ethiopian Higher Education Entrance Qualification Examination Grade point Average (EHEEQE GPA) is _____

2.2 Your current cumulative Grade point Average (CGPA) is _____

2.3 Is this department your first choice? Yes ☐ No ☐

2.4 What do you study for exam?

Lecture notes only ☐ Books only ☐ Lecture notes, books and other material ☐

2.5 Where do you study most of the time?

Dormitory ☐ Library ☐ Other place ☐

2.6 How do you study most of the time?

By attempting to memorize ☐

Producing short notes and attempting to memorize ☐ Other ☐

2.7 Do you study alone or in group?

Alone ☐ In group ☐

2.8 How many hours, on average, do you study in a day? _____

2.9 When do you start reading for exams?

From the date of exam schedule or proclaimed☐

Starting from the beginning of the classes or some weeks after the classes began☐

2.10 For what purpose do you study most of the time?

To pass the exams only ☐

For general Knowledge and to pass the exams ☐

2.11 Have you ever been frustrated for academic dismissal?

No ☐ Yes ☐

2.12 There is lack of relevant reference materials (books) in the library.

Agree ☐ Disagree ☐ Undecided ☐

2.13 There is lack of textbooks or modules

Agree ☐ Disagree☐ Undecided ☐

2.14 There is lack of smooth interpersonal relation ship between teachers and students in the teaching-learning process.

Agree ☐ Disagree ☐ Undecided ☐

2.15 Most teachers help both male and female students equally in their respective courses

Agree ☐ Disagree ☐ Undecided ☐

2.16 There is adequate library service in relation to working hours and utility of the available materials

Agree ☐ Disagree ☐ Undecided ☐

DECLARATION

I, the undersigned, declare that the thesis is my original work, has not been presented for degrees in any other University and all sources of materials used for the thesis have been duly acknowledged.

Name: Dilmeta Alamirew

Signature:

Place: Faculty of Science, Addis Ababa University

Date of Submission: January 2008