AN INVESTIGATION INTO THE EXTENT TO WHICH CERTAIN PSYCHOLOGICAL AND SOCIOLOGICAL FACTORS INFLUENCE ACADEMIC ACHIEVEMENT AMONG FIRST-YEAR STUDENTS IN THE FACULTY OF EDUCATION AT THE UNIVERSITY OF DURBAN-WESTVILLE

BY

PERUMAL KISTNA GOUNDEN

B.Sc. (Hons.), B.Ed. (S.A.)

Submitted in part fulfilment of
the requirements for the degree

MASTER OF EDUCATION

in the Department of Empirical, Special
and Remedial Education in the Faculty
of Education at the University of
Durban-Westville

DURBAN

DECEMBER 1977

To my father
the late Kistna Gounden
for his profound faith in formal education
of which he had none.

ACKNOWLEDGEMENTS

I am much indebted and most grateful to the following whose encouragement and assistance have made this research possible:

Professor A. Leslie Behr, Head of Department of Empirical, Special and Remedial Education, who provided advice and inspiration while supervising this research;

Mr Krishna Naidoo, a colleague from the Physics Department of the University who most willingly wrote and ran the computer programme;

Dr George S. Jackson, a colleague from the Faculty of Education, who kindly checked the language of the dissertation;

Colleagues from the Faculty of Education and other Faculties who assisted in various ways;

Students from the Faculty of Education who participated in this investigatio

Miss Radha Kaligan who typed the thesis;

The Human Sciences Research Council for financial assistance.

PERUMAL K. GOUNDEN

DURBAN

DECEMBER 1977

CONTENTS

PAGE

PAGE

PAGE

APPENDICES

LIST OF TABLES

CHAPTER ONE

1. THE NATURE, EXTENT AND SIGNIFICANCE OF THE PROBLEM AND RESEARCH PROCEDURES TO BE FOLLOWED

1.1 THE NATURE AND EXTENT OF THE PROBLEM

The problems of high failure rate and drop-out at university level are international. "Failure" is defined as the inability to meet the examinati requirements in a subject or subjects, resulting in the student being unabl to complete his diploma or degree in the minimum period laid down by regulations. "Drop-outs" are defined as students who leave a university or college without obtaining a degree or a diploma. The term "wastage" is als used when reference is made to drop-out and failure.

The University of Durban-Westville, like universities the world over, is faced with the problem of high failure rate among its students, particularly first-year students (Olivier, 1977). In a report prepared for the Joint Matriculation Board of South Africa, Steyn (1963) stated that only 55% of all full-time White students obtained their degrees in the minimum period plus two years. Behr and MacMillan (1966, 229) describe the problem of failure in the first year at South African universities as a serious and a national one with 35% of the students failing in the first year. The Commission of Inquiry into universities in South Africa (van Wyk de Vries *et al*, 1974, 232) expressed serious concern at the high failure rate among university undergraduates, particularly first-years, and warned that "the

country could not afford to squander the intellectual potential of its human material."

Furneaux (1961, xiii) gave the figure for first-year failures in British universities as 20% for the three year period 1948 - 1951. Ten years later the University Grants Committee (1968) in its report on students' progress revealed 13,3% wastage. Failures ranged from 3,4% at Oxford and Cambridge to 34% in other universities. It should be noted that the British system is highly selective and has, by tradition, a low overall failure rate. Summerskill (1962, 636) writes that American colleges and universities lose about half their students before graduation. Some 40% graduate on schedule and a further 20% take longer than the minimum prescribed period.

Since educated people are among the nation's best resources and education is one of the chief assets of the individual, there is a compelling need for research in order to identify factors that affect academic performance, especially at tertiary level. While overseas universities have done a fair amount of research in this connection, comparatively little has been done in South Africa.

1.2 THE SIGNIFICANCE OF THE PROBLEM

Bloom and Peters (1961, 6) claim that the problem of predicting success at tertiary level has probably received more public attention than any other single issue in education. The reason for this, they say, is that the transition from school to college or university is one of the most crucial choice-points in the career of the individual.

A student's failure at university level is a painful experience, both financially and personally. It is necessary, therefore, for the university on its part to have adequate selection procedures that will ensure that the

student has a reasonable chance of passing. Since (as will be shown in Chapter Two), a student's success is dependent also on other factors, su as teaching methods and study techniques, these will have to receive due consideration as well.

Summerskill (1962, 637) rightly points out that since the objectives of colleges are to educate and prepare for graduation the students they admit, academic failure must be viewed as a failure on the part of the institution as well as on the part of the individual student.

The van Wyk de Vries Commission into universities (1974, 232) stated that the high first-year failure rate was a source of concern to the State, the University, the parents and the students themselves. The Secretary of the Joint Matriculation Board, Le Roux (1976), urged that the matter of failure at university be tackled on a broad front in view of the huge wastage of time manpower and private and public funds.

The ever-increasing growth in university enrolments — coupled with an insatiable demand for graduates with the necessary industrial, technical and commercial know-how — has spotlighted the need for ensuring greater success at university and a drop in the failure rate.

Lavin (1965, 11) states that the recent concerted study of educational problems by sociologists has given additional impetus to the enquiry into academic achievement. Cattell and Butcher (1968, 219) urge that the full opportunities for developing the talent of every individual are no longer an idealistic or utopian aim, but a sheer economic and realistic necessity if a country's achievement and potential are not to suffer. Similar beliefs led to the National Bureau of Educational and Social Research (now the Human Sciences Research Council) undertaking the Project Talent Survey, one of the largest

long-term research projects in education ever undertaken in South Africa. T study, which began in 1965, aimed at obtaining an estimate of South Africa's White man-power potential and also at determining or identifying factors and circumstances that promoted or hindered maximum development of such potentia

However, the state of knowledge in respect of prediction of academic success at university is not yet at a sufficiently adequate level to be used with confidence (Lavin, 1966). More information is required on the factors that are peculiar to study and success at university as distinct from school.

1.3 BACKGROUND FOR STUDY

Behr and MacMillan (1966, 230) believe that the problem of first-year failure in South Africa will not be easy to solve as it is a culmination of weaknesses which characterize the whole South African educational system. Van Wyk de Vries *et al*, (1973, 233) state that there is no single formula for solving the problem of high failure rate among undergraduates. The reasons for the high failure rate stem from an accumulation of factors and circumstances. The solution must be found in a collection of measures covering the entire university field.

In a report prepared for the Committee for Higher Education and Research of the Council of Europe, Daniëls (1970, 40) states that university education, by virtue of the complexity of its process, operates far below its optimum. This view, he says, is shared by many university educators. He then sets out several proposals, including reduction of student numbers, and more effective screening procedures as methods for ameliorating the position.

In a report on the South African situation, van der Merwe (1973) states that the high failure rate may be accounted for by the following factors:

UNIVERSITY OF DURB... LIBRARY

ineffective tuition, poor student selection, poor course selection, inappropriate study methods, lack of necessary knowledge on the part of the university lecturer of his changing role. Visser (1968) ascribes the high failure rate to the radical differences between high school and university study methods, personality problems and immaturity among some students.

The Secretary of the Joint Matriculation Board, Le Roux (1976), states that at least 90% of the present day matriculants have the necessary intellectual capacity to study at university but such capacity alone is not enough for success. Other factors that contribute to failure are sociological, psychological and other external ones.

Students are admitted to university mainly on the strength of achievement tests or ability tests. Lavin (1965, 12) points out that recognition of the fact that some students perform better and some worse than predicted by such tests has led to a search for other factors involved. Miller (1970, 140), in his examination of success, failure and wastage in higher education in Great Britain and elsewhere, warns that, while school results are the best single predictors of success at tertiary level of education, they are inadequate for the prediction of success. Summerskill (1962, 636), reporting on a review of numerous studies on college grades, claims that 35 of these studies revealed that only 1 out of every 3 drop-outs occurred for academic reasons only.

Students' problems are related to their abilities, interests, personalities and motives, including incentives of status and remuneration (Miller, 1970, 3) One must move away from the oversimplified view of equating ability with academic promise. Summerskill (1962, 637), in his study of drop-outs from college, states that, in general, attrition problems that predominate in college involve the student's failure to meet the psychological, sociological

and economic demands, rather than the strictly academic demand of the university environment.

An extensive United States review by Bloom and Peters (1961) of more than 40 years of research on academic prediction revealed that product-moment correlation coefficients ranging from 0,40 to 0,60 can be expected when high school grades, aptitude test scores and achievement test scores are contrasted individually with college grades. In combination, these intellectual factors have yielded multiple correlation coefficients varying from 0,55 to 0,65. Other research (Denham, 1966; Astin, 1971) has confirmed that about 50% of the variance in academic performance is accounted for by measures of ability. The search for factors contributing to the remaining 50% continues. Arising out of sociology's recent concerted entry into educational problems, socio-economic determinants have come under experimental scrutiny. The influence on university performance of factors like parents' education and occupation, study facilities, areas of residence, sex and finance is being studied (Furneaux, 1961, 52; Lavin, 1965, 123; Cattell and Butcher, 1968, 288; Miller, 1970).

Boone (1966, 12) claims that, in an attempt to improve prediction, researchers are investigating new predictor variables with much of the interest being directed at non-cognitive factors like motivation, emotional stress and personality. However, research with intellectual predictors still continues. Cattell and Butcher (1968, 217) point out that even the shortest summary of factors affecting academic achievement would be seriously one-sided without some consideration of environmental factors as such. Sociologists would indeed argue that environmental differences are of paramount importance and that they largely dictate the individual differences that psychologists assess.

McConnell and Heist (1962, 249), in a study of college students, postulate that a minimal programme of assessment including academic aptitude and achievement, biographical information, social and cultural background and a few revelant personality characteristics, will provide a meaningful description of the student body as a whole and of the subgroups that are fou on most campuses. Lavin (1965, 37) warns that many variables presently in use seem to have some underlying similarities though differently labelled.

This state of affairs has arisen primarily because most studies use only one or two variables for prédicting academic performance. What is needed is more studies that use a large number of variables. These would allow for the evaluation of the independence of each variable so that eventually a smaller number of predictors would result with the dependent ones classified together.

Comparative educationists and administrators rightly ask to what extent research findings in other countries can be applied to local educational policies. The enormous differences between universities in different countries are probably almost as great among universities in any one country.

A good deal of variation in the proportion of failures is found from university to university, from faculty to faculty, and in the same subjects in different faculties (Behr and MacMillan, 1966, 229). Boone (1966, 22) finds evidence in several American studies that prediction formulae derived from one population could not be applied to other populations without loss of precision. The literature recommends that predictive techniques should be developed on an institutional or departmental basis (Bloom and Peters, 1961, 138). Miller (1970, 226) concedes that application locally, of research

done in other countries, is often more valid than a hunch or tradition; but emphasizes that local research is necessary as a sound basis for future policy.

Although information gained by research should be shared by all universities van der Merwe (1973) believes that the results are not directly applicable to or necessarily valid for the situation at a particular university.

1.4 THE SPECIFIC PROBLEM BEING INVESTIGATED AND ITS CONTEXT

Since it has been established that both failure and wastage are heaviest in the first year, the present investigation is restricted to students in their first year of study in the Faculty of Education at the University of Durban-Westville. The reasons for restricting it to a particular faculty are apparent from what has been said earlier in this chapter.

The purpose of this research is to identify factors that affect the examination performance of students. This will be done by computing the correlations between selected factors and examination performance. The inter-relationship between the factors themselves will also be determined statistically.

The University of Durban-Westville was established in terms of the Extension of Universities Education Act of 1959 and opened in Durban in 1961 as the University College for Indians. In 1971 it attained full university status as the University of Durban-Westville. From an initial enrolment of 114 students in 1961 it now has 2 700 students (1975).

Like other South African universities, the University of Durban-Westville is organised on a basis of departments and faculties (Behr and MacMillan, 1966, 222). At present it has five faculties: Arts, Science, Law, Commerce and Administration, Education — and about 50 departments.

In the Faculty of Education, several initial teacher-training courses are offered. The entrance requirements in respect of each will be described. The entrance qualifications for the University Diploma in Education (UDE) (for students who matriculated before 1975) are: Matriculation, or a School Leaving Certificate (at the Advanced Level) obtained in any Province of the Republic, provided that at least 40% was obtained in an official language on the higher grade; or any other qualification accepted by the Senate as equivalent. Applicants may be required to undergo a series of tests and/or a medical examination before admission (University of Durban-Westville Prospectus, Faculty of Education, 1976, 12 - 14).

The entrance requirements for the Bachelor of Paedogogics degree (B.Paed) (for students matriculating before 1975) are: Matriculation or conditional exemption from the matriculation examination; 40% in the matriculation in at least 4 recognized subjects including a language subject on the higher grade, a second language subject on the higher or standard grade, Mathematics or a Science subject or a third language subject. A student may be required to undergo a medical examination (University of Durban-Westville Prospectus, Faculty of Education, 1976, 1).

The UDE is a three-year integrated diploma, in which subjects are studied concurrently in the Faculty of Education and in the other Faculties. The B.Paed is a four-year integrated degree in which subjects are studied concurrently in the Faculty of Education and in other Faculties.

1.5 ASSUMPTIONS, LIMITATIONS AND DEFINITIONS

1.5.1 Assumptions

The following assumptions were made to establish a basis of procedure for this research:

First-year final examinations of the University of Durban-Westville yield valid measures of students' academic performance.

The criterion measure in the traditional form of grade-point average is representative of overall academic achievement of first year students.

The students responded without bias to questions in some of the instruments administered to them.

1.5.2 Limitations

The present investigation was designed and implemented within the limits prescribed below:

The present study is limited to first year students in the Faculty of Education in the year 1975.

The study is limited by the degree of reliability and validity of instrument selected for this study.

This investigation is limited by the ability of the investigator to construc an instrument to measure certain biographical and sociological determinants.

1.5.3 Definitions

The terms "failure", "drop-out" and wastage" have been defined earlier in th: chapter.

Academic performance refers to the scholastic standing of a student at a given moment. In the present investigation it is the student's performance in the final examinations of the first year at university.

Definitions of other terms relevant to this investigation will be given in the next chapter.

1.6 RESEARCH PROCEDURES IN THE PRESENT STUDY

(a) Review of the relevant literature (See Chapter Two).

(b) Description of the selection of factors and instruments; the construction of an instrument; the selection of students and the administration of instruments (See Chapter Three).

(c) A preliminary analysis of the data and interpretation of of results, using:

(i) frequency distributions,

(ii) analysis of variance techniques or chi square

(See Chapter Four).

(d) Presentation of correlational analysis and interpretation of results, involving gross, partial and multiple correlation (See Chapter Five).

(e) A summary of the investigation, followed by a report on implications and recommendations (See Chapter Six).

CHAPTER TWO

2. A REVIEW OF SOME MAJOR RESEARCH STUDIES THAT HAVE A BEARING ON THE ACADEMIC PERFORMANCE OF FIRST-YEAR UNIVERSITY STUDENTS OVERSEAS AND IN SOUTH AFRICA

2.1. INITIAL PROCEDURE

Research overseas into academic performance at university level has been extensive. In the United States alone an average of 58 studies per year pertaining to prediction, selection and guidance in universities and colleg indicates the importance attached to the problem of failure and drop-out at tertiary level (Fishman & Pasanella, 1962, 666). In Great Britain, too, there is more concern today than ever before about the performance of students in institutions of higher learning (Oxtoby, 1967, 38). Australian universities have also undertaken numerous investigations into student achievement at university level (Miller, 1970, 10). In South Africa, only a limited amount of research has been undertaken into the academic performance of university students (Visser, 1968).

However, while the research mentioned above has emphasized the importance of intellectual factors for university success, it has also revealed that factors other than academic ability are important (Lavin, 1965, 43; Miller, 1970, 29). Between thirty-five and forty-five per cent of the variation in academic performance is accounted for by measures of ability (Daniëls, 1970, 65). A great majority of recent studies have attempted to improve prediction through a consideration of additional factors of a non-intellectual nature (Lavin, 1965, 22). Non-cognitive variables, used in conjunction with

cognitive variables, increased the prediction correlation (Denham, 1966; Spector, 1966; Marshall, 1968). Non-intellectual factors that have emerged as influential in academic attainment as university include personality and sociological factors.

An initial, cursory review of the literature revealed numerous factors that researchers and writers have found to affect the academic performance of students at university, particularly those students in their first-year (*inter-alia*, Sandford, 1962; Daniëls, 1970; Miller, 1970; Astin, 1971). From these a short list of 40 factors that appeared consistently in the literature was selected by the present writer.

These factors were: scholastic aptitude, high-school achievement, personali motivation, emotional stress, self-concept, proficiency in English, academic adjustment, lecturing, academic demands, ambition, interest, attitudes, choice of courses, examinations, maturity, study methods, effort, lack of detailed syllabus, career aspirations, father's occupation, father's education, study facilities, distance from university, economic area of home, residence, social adjustment, social class, family income, culture, age, extra-curricular activities, sex, health, sex problems, family conflict, size of family, birth rank, religion, marriage plans and home regime.

Roneoed copies listing these factors were given to colleagues in the Faculty of Education. They were asked to indicate which they regarded as important for the academic success of first-year students at university. The responses of the lecturers were scrutinized and those factors regarded as important by 70% or more of the respondents were selected for further investigation.

A short list of seventeen factors was obtained. These were re-classified by the writer into two categories – psychological and sociological. The

seven psychological factors comprised: scholastic aptitude, study methods, academic adjustment, personality, interest, high-school achievemer and persistence. The ten sociological factors were: parent's occupation, family conflict, parent's education, distance from university, type of residence, study facilities, family income, home regime, size of family and career aspirations.

In order to assist the present writer in his final selection of variables for his investigation, this second, reduced short list of variables was then circulated in the form of a questionnaire among Faculty colleagues who were asked to rank these factors presented under the two categories psychological and sociological, in order of importance. Their replies were again analysed statistically and ranks for the two sets of variables were obtained. (See Appendix B1). The psychological variables, in order of descending importance, were: scholastic aptitude, interest, high school achievement, study methods, personality, persistence, academic adjustment. For the sociological variables the order in descending importance was: parent's education, family income, parent's occupation, family conflict, study facilities, career aspirations, type of residence, home regime, distance from university, size of family.

Thereupon, the author made a more intensive study of the research literature relating to these factors with a view to arriving at a final list of factors to be considered in this study.

2.2 PSYCHOLOGICAL VARIABLES

2.2.1 High-School Achievement

2.2.1.1 Definition of High-School Achievement

Achievement concerns the learning of specific subject matter up to a specific point in time. High-school achievement is the quality of a student's accomplishment at high school as reflected by the symbols in specific subjects

examined externally at the end of the final year.

2.2.1.2 Research Evidence Supporting High-School Achievement as a Factor Affecting Performance at University

A great majority of researchers and writers agree that of all the information available about the high school student, his record of academic achievement is the best single indicator of how well he is likely to do at university.

Support for the above hypothesis comes from the United States (Bloom and Peters, 1961, 4; Black, 1965; Boone, 1966; Worsely, 1967; Astin, 1971, 5; Khammash, 1974), Great Britain (Furneaux, 1961, 97; Iliffe, 1968, 54; Miller, 1970, 100) and South Africa (Malherbe, 1937; Black, 1957; Brandford, 1961, 39; Malherbe, 1977). In all these studies superior attainment at high school is associated with superior performance in the first year at university.

2.2.1.2.1 Correlation Coefficients Between High-School Achievement and First-Year University Performance

Arising from the above it would be appropriate to consider correlation coefficients obtained by researchers between high school achievement and university first year achievement. In the United States, Cranford and Burnham (1961, 37) studied the extensive literature relating to academic performance at university and calculated the average correlation for first year students to be 0,50. In South Africa, Brandford (1961, 189) obtained a correlation coefficient of 0,44. Figures in Britain range from 0,14 to 0,184 (Iliffe, 1968, 12) while in New Zealand, Parkyn (1959) obtained correlation coefficients ranging from 0,15 to 0,36. The correlations were significant at the 1% level in all cases.

2.2.1.3 A Warning Against Too Blind a Faith in Matriculation Results

A few investigators have warned that the predictive value of high school achievement for first year attainment at university is questionable (Cattell and Butcher, 1968; Miller, 1970 100). The requirements for success in university examinations are different from those experienced by students at high school. Whereas in the latter regurgitation of factual matter still appears to play a prominent part, at university application and evaluation of subject matter are emphasized (Behr and MacMillan, 1966, 230; van Wyk de Vries *et al*, 1974, 239).

2.2.1.4 Conclusion

The support for high school achievement as an important factor for academic success in the first year at university is substantial.

2.2.2 Scholastic Aptitude

2.2.2.1 Definition of Scholastic Aptitude

"Aptitude is the specific ability or potential for doing well in a certain type of endeavour" (McMahon, 1977, 281).

Scholastic aptitude is ability or potential for academic work (Astin, 1971, 7).

2.2.2.2 Scholastic Aptitude Tests

Aptitude tests developed out of Thurstone's seven primary abilities theory (Schofield, 1972, 89). Aptitude tests are therefore not separate from test of intelligence and abilities, but are designed to bring greater precision into measuring people's suitability in specific directions. Aptitude tests predict performance not yet attained. Scholastic aptitude tests like, *inter-alia*, SAT, DAT, contain subtests akin to intelligence tests (Cattell and Butcher, 1968, 48; Schofield, 1972, 90).

2.2.2.3 Research Evidence Supporting Scholastic Aptitude as a Factor that Affects Academic Performance at University

There is considerable support in the literature for the thesis that scholastic aptitude is an important factor for academic success at university. The strongest support comes from the United States which has developed and used scholastic aptitude tests like the American College Test (ACT), Scholastic Aptitude Test (SAT), National Merit Scholarship Qualifying Test (NMSQT) for a long time (Boone, 1966, 44; Boise, 1973; Ennis, 1973; Harding, 1974). Both Great Britain and Australia have generally accepted that scholastic aptitude tests are necessary for selecting university students (Eysenck, 1947; Grey and Short, 1961; Miller, 1970).

Two points need emphasis at this juncture. Firstly, the basic assumption underlying the testing of scholastic aptitude is that students with greater scholastic aptitude achieve at a higher academic level at university than do students with lower scholastic aptitude (Bloom and Peters, 1961, 58). Secondly, scholastic aptitude test scores are seen as augmenting academic qualifications (achievement) rather than replacing them. Research has shown that selection procedures using scholastic aptitude scores, amongst others, are more valid than those that omit them (Bloom and Peters, 1961, 58; Furneaux, 1961, 132; Miller, 1970, 229).

2.2.2.3.1 Correlation Coefficients Between Scholastic Aptitude Scores and Academic Performance Scores at University

United States studies have reported correlation coefficients ranging from 0,30 to 0,55 between scholastic aptitude and university achievement of first-year students (Lavin, 1965, 57; Astin, 1971, 8). In Great Britain, Eysenck (1947) reported an average correlation of 0,58 between ability tests and university achievement. In South Africa, Gouws (1957) obtained correlati

of 0,235 and 0,314 between intelligence tests and first year university performance.

2.2.2.4 Research Findings that Fail to Support Scholastic Aptitude as an Important Factor for Success at University

A few researchers have expressed certain reservations in respect of scholast aptitude. Miller (1970, 36) regards it as a threshold variable — a certain level is required but, given that, it is not absolutely crucial. The Transvaal Education Bureau (1967) reported that one-fifth of all failures in South African universities possessed very high scholastic aptitude. Reuning (1957) obtained a low correlation (0,02) between academic ability and first-year university achievement at Witwatersrand University. An Australian study showed that scholastic aptitude enhances prediction in some subjects only (Sanders, 1963).

2.2.2.5 Conclusion

From the literature reviewed by the writer, there appears considerable support for scholastic aptitude as a factor affecting the academic achievement of first-year university students. Amongst highly selected students, like those in the United Kingdom, the correlation coefficients between scholastic ability and achievement are smaller.

2.2.3 Personality

2.2.3.1 Theories of Personality

The study of personality has progressed along three rather separate lines: the literary, the clinical and the experimental statistical (Cattell and Butcher, 1968, 69). Many theories of personality have arisen: trait theories, psycho-analytic theories, social learning theories, humanistic personality theories (Hilgard, *et al*, 1975). Definitions of personality are, therefore, diverse (Schofield, 1972, 105; Behr, 1975, 96).

Some theorists see personality an an entity. Definitions like "Personality is the dynamic organisation within the individual of those psychophysical systems that determine his unique adjustments to his environment" (Allport, 1937, 48) emphasize this standpoint. Others, especially the experimental-statistical theorists, regard personality as comprising a number of factors or dimensions. Protagonists of this theory are Butcher, Cattell, Eysenck and Guilford.

2.2.3.2 The Statistical Factor – Analytic Theory

Over the last two decades, the experimental-statistical theory progressed most rapidly. It has investigated personality patterns that could be demonstrated by calculation and measurement (Cattell and Butcher, 1968; Brody, 1972, 43). Two foremost theorists of this school are Eysenck and Cattell. Cattell has obtained 16 personality factors, while Eysenck has offered two major dimensions of personality. Most recent studies investigat the influence of personality on university attainment have been concerned wi Eysenck's two broad-based second order factors of Extraversion and Neurotici (Cattell and Butcher, 1968, 182; Miller, 1970, 69; Brody, 1972, 190). Therefore it was decided to review literature on academic performance at university related to Eysenck's personality dimensions.

2.2.3.3 Eysenck's Dimensions of Extraversion and Neuroticism

Eysenck used factor analysis to discover his principal dimensions of personality. According to Eysenck "Extraversion is characterized by sociability, activity, optimism, outgoing and impulsive behaviour etc. while introversion is characterized by unsociable, passive, quiet, thoughtful and reserved behaviour. Similarly with respect to Neuroticism, the unstable person is moody, touchy, anxious, restless, rigid; while the stable person is calm, carefree, easy-going, reliable and so forth. It is not assumed of course that everyone will be either an extravert or an introvert, or either

stable or unstable; people can be found at all intermediate stages between these extremes and the evidence suggests that distribution of either of these two dimensions is roughly normal."

2.2.3.4 Extraversion and Academic Performance at University

Most of the research evidence known to the writer supports the contention that the introvert is a better student at university (Spencer, 1958; McConnell and Heist, 1962; Cattell and Butcher, 1968, 182; Orpen, 1970, 16; de Vecchio, 1971; Entwhistle and Brennin, 1971, 286; Anthony, 1973, 223; Sumner, 1974, 87).

The supremacy of the introverts over the extraverts is attributed, *inter ali* to the following facts: they spend more time on their study, they are prepared to sacrific social standings among peers, they have better study methods (Lavin, 1965, 190; Orpen, 1970, 190; Entwhistle and Entwhistle, 1970, 132).

Only a few investigations have shown that extraversion has a positive correlation with performance at university (Martray, 1971; Mehryar *et al*, 1973).

2.2.3.5 Neuroticism and Academic Performance at University

Some overseas studies report that high neuroticism is associated with superior academic attainment at university (Crouch, 1968; Entwhistle and Brennin, 1970, 132; Sumner and Warburton, 1972, 85; Bayer, 1971; Stuttler, 1973).

Researchers who have found no relationships between neuroticism and achievement at university level include Orpen (1970); Cowell and Entwhistle (1971, 75); Entwhistle and Entwhistle (1970, 132).

2.2.3.6 The Effects on Achievement of Extraversion and Neuroticism Combine

Some investigators have combined extraversion and neuroticism to yield the following 4 categories: stable extraverts, unstable extraverts, stable introverts, unstable introverts. Evidence suggests that the most successful students at university are the unstable introverts followed by the stable introverts, unstable extraverts, stable extraverts, in that order (Furneaux, 1961; Entwhistle and Entwhistle, 1970, 132; Mehryar *et al*, 1973).

2.2.3.7 Conclusion

While the literature surveyed reveals introversion as generally favoured as a desirable quality for academic success at university, the research evidence in respect of neuroticism is inconclusive.

2.2.4 Interests

2.2.4.1 What is Meant by Interest

Interests are associated with satisfaction derived from indulging in certain types of activity. They can therefore be described as a person's likes and dislikes for activities and objects. Interest can be defined as an attitude towards an activity or object. Occupational interest is the satisfac which a person derives from activities which are central to the nature of his job. Issues of salary, status, promotion etc. are not really relevant here (Behr, 1977, 179).

2.2.4.2 Types of Interests

Interests can be categorised as expressed, inventoried, manifest and tested (Behr, 1977, 179). Expressed interests are statements made by a person about his interests. Inventoried interests comprise a list of statements by the person of his likes and dislikes which are summed and compared with statements made by others. Manifest interests are defined in terms of a person's overt activities. Tested interests are defined by what a person learns, assuming

that he learns what interests him.

2.2.4.3 Interests and Academic Achievement at University

Many researchers support the thesis that failure at university is caused by lack of interest or loss of interest in subjects or courses studied (Himmelweit, 1950; Olsen, 1957; Iffert, 1962; Sandford, 1962, 21; Broe, 1964).

A few studies have been unable to establish significant relationships between interests and academic performance at university (Lavin, 1965; Kearney, 1966).

2.2.4.4. Interests and Occupational Choice

Since occupational choice is bound up with subject choice, and this in turn with interests, studies concerning occupational choice and interests were reviewed to examine their relationship with academic achievement. They revealed that students who chose careers that fell outside many of their interests, met with unnecessary failure (Lavin, 1965, 37; Roberts, 1967; Philips, 1968, 355). Students take courses of study incongruent to their interests for many reasons, the principal ones being the attraction of high prestige occupations and strong parental influence (Daniëls, 1970, 42; Behr, 1972, 1).

2.2.4.5 Conclusion

The literature reviewed indicates that the interests of a student should not b ignored when explanations are sought for his poor academic performance at university.

2.3 SOCIOLOGICAL VARIABLES

2.3.1. Parent's Education

2.3.1.1 Parent's Education and Academic Performance

Researchers have found that students with better-educated parents perform

better at university than students with parents whose educational levels are lower (Brown, 1962; Astin, 1970, 43; Cavender, 1974).

Other researchers have confirmed the above finding but contend that the high relationships between parent's education and the academic achievement of thei off-spring is due only partly to the higher education of the parents. The greater pressure to succeed, which is characteristic of better-educated parents, is another contributing factor which re-inforces the already more stimulating home environment (Farnsworth *et al*, 1962; Astin, 1971, 14).

A few studies have reported no significant differences between parent's education and academic achievement at university level (Himmelweit and Summerfield, 1951; Iliffe, 1968).

2.3.1.2 Father's Education and Academic Performance

Some researchers have investigated the relationship between the father's education and the academic achievement of his son or daughter at university. Those whose findings have been reviewed by the writer have concluded that there is a positive correlation between father's education and university attainment (Boone, 1966, 16; Glenn (Senior), 1971; Al Bassam, 1973).

2.3.1.3 Mother's Education and Academic Performance

The influence of mother's education on the academic achievement of her off-spring has been singled out for study by some researchers. Those that have established positive significant correlations between mother's eudcatio and students achievement include Sandford (1962, 548); Brown and du Bois (1964); Herrenkohl (1972, 325).

2.3.1.4 The Education of Indian South African Parents

For those not familiar with South African history it must be pointed out that the first Indians came to this country from India in 1860 as indentured labourers to work in the sugar plantations. They had no Western education ar

it is only since the turn of this century that Indian education became a reality.

Thus one can understand why Maharaj (1968) stated that the majority of Indian parents were not in a position to assist their children educationally. However, statistics revealed by Behr and Behr (1965) and Behr (1972) indicate that the educational levels of the parents of Indian students are rising rapidly.

2.3.1.5 Conclusion

The research evidence discussed above confirms that the educational levels of both mother and father are important factors that affect the achievement of students at university.

2.3.2 Parent's Occupation

2.3.2.1 Parent's Occupation and Academic Performance

Research evidence in Great Britain revealed that the most successful students at university come from professional families, followed by clerks, skilled workers, semi-skilled workers and unskilled workers, in that order (Furneaux, 1961, 52). Numerous studies in the United States, Great Britain, India and Australia substantiate the hypothesis that students who perform better at university come from homes where the parents are at higher occupational levels (Harris, 1940; Hammond, 1957; Schonell *et al*, 1962; Sinha, 1966).

2.3.2.2 Father's Occupation and Academic Achievement

The occupation of the father has been singled out in many studies. The evidence supported the thesis that students whose parents are at the highest occupational level perform significantly better at university (Sandford, 1962 Andrulis, 1968; Chopra, 1969, 435).

Some researchers found significant relationships between the tendency to drop out of university and the low level of father's occupation (Astin, 1964; Sinha, 1966).

It has also been postulated that it is not the occupational level *per se* of the father that affects academic performance but the inherited intelligence, and the middle class value of learning for its own sake. Cultural values, pressures and interests of people in different occupational levels are influential (Roe, 1953; Venables, 1963).

2.3.3.3 Conclusion

The research evidence reviewed above emphasizes the importance of the parent's occupation, especially that of the father, for achievement at university.

2.3.3 Home Regime

2.3.3.1 What is Meant by Home Regime

Home regime refers to the power relationship at home (democratic or autocratic), the family relationship (harmonious or strained) and the degree of power the student has in decision-making in matters affecting him.

2.3.3.2 Student Achievement and Family Relationships

There is remarkable agreement on the inference that achieving scholars come from homes where freedom of thought and communication exist between family members and where autocracy is minimal and distribution of authority is democratic. Superior student achievement is associated with homes where parents lead harmonious and stable lives and are interested in the academic careers of their off-spring who have a say in decision-making; and where there is agreement in defining important issues (Strodtbeck, 1962; Lavin, 1965, 148; Daniëls, 1970, 67; Miller, 1970, 48; Banks and Finlayson, 1973, 84; McCall and Thomas, 1974; Schwarzweller and Lyson, 1974, 433). Individual who seek education at tertiary level come from egalitarian and democratic

homes with decision-making not centred in one person. Such regimes improve initiative and self-reliance, the result being better academic achievement (Elder, 1965; Miller, 1970, 82). Punitive, autocratic and dominating parents make children take an over-submissive role and as a result produce non-enquiring minds (Grey and Short, 1961; Miller, 1970, 82).

2.3.3.3 Achievement and Father's Relationship with Student

The role of the father has been investigated in family relations which affec academic success at university. Better-achieving students come from happier homes and have a more secure relationship with the father (Lavin, 1965, 148) An authoritarian and restrictive approach by the father lowers the need for achievement (Cattell and Butcher, 1968, 222).

2.3.3.4 Achievement and Mother's Relationship with Student

It has been demonstrated that the greater the degree of power the mother anc son have relative to the father, the higher the son's achievement (Strodtbe 1962). It has also been shown that mothers expressing autocratic attitudes have unsuccessful sons (Banks and Finlayson, 1973, 85). However, it would appear that fathers are generally more authoritarian than mothers (Mack, 1974, 409).

2.3.3.5 Achievement and Family Discord

Research evidence indicates that family discord has an adverse effect on academic achievement at university (Flecker, 1959; Merril, 1964, 47; Stac and Cook, 1973, 130). Family conflict is disrupting to a student's university life and causes him personal worry. His studies suffer as a result.

Some researchers have found that family conflict does not have a major impa on university attainment (Himmelweit and Summerfield, 1951; Hopkins *et al*,

1958). They reported no significant differences between university achievement and family conflict.

2.3.3.6 Conclusion

While the evidence reviewed does not reveal unanimity, it does, however, point strongly in favour of the contention that the type of regime at home is an important factor affecting achievement at university level.

2.3.4 Age

2.3.4.1 Definition of Age

By age is meant the chronological age of the student at entry to university, expressed in years, e.g. 18, 19, etc. years.

2.3.4.2 The Younger Student a Better Achiever

Brandford (1961, 232) found that the most successful pre-medical students in his study were those under 18 years. Two American studies conclude that more students graduate from those who are 17 or 18 years at entry than from students who enter when they are older (Berg, 1973; Lawry, 1973). Many oversea studies have shown younger students to be more successful at university than older ones (Flecker, 1959; Hughes, 1960; Berg, 1963; Sanders, 1963; Lawry, 1973).

2.3.4.3 The Older Student the Better Achiever

A few studies have come out in support of the older student as a better achiever at university (Husemoller, 1969; Herridge, 1971).

Some studies have concerned themselves with the university performance of ex-servicemen and veterans. Such studies invariably show that the ex-servicemen and veterans perform significantly better at university than students direct from school (Sanders, 1951; Ryan, 1961). Harris (1940) cites research which revealed that boys out of school for two years before entering university,

and girls out of school for one year or more, did superior academic work at university. It is possible that a year in industry or other work is a good test of a student's motivation to pursue a university course. As regards the ex-serviceman or the veteran, it is probable that his greater maturity and higher motivation for study make him a more successful student.

2.3.4.4 Age Not a Factor Affecting Achievement

Some studies have failed to support age as a factor affecting academic success. Some South African universities have analysed evidence relating student's ages on admission and their academic performance and found little or no relationship (van Wyk de Vries *et al*, 1974, 239). A few overseas studies have also found similar evidence (Himmelweit and Summerfield, 1951; Hopkins *et al*, 1958).

2.3.4.5 Conclusion

For students who come to university directly from school, the evidence from the literature shows the younger student to be often the higher achiever.

2.3.5 Sex

2.3.5.1 The Female Student a Higher Achiever at University

Astin (1971, 5) says that "literally hundreds of studies in the United States show that female students at university obtain better grades than males." Similar support in the United States for the academic superiority of the female university student comes from Summerskill (1962), Lavin (1965, 52), Worthington and Grant (1971, 7), Boise (1973), Pricer (1973) and Mittanck (1974) Even among disadvantaged students, females were academically superior performers (Parillo, 1971). In Great Britain, Furneaux (1961, 234) reported that women students were less likely to fail than male students. Evidence from South African universities also favours the female student as a higher achiever at university (Malherbe, 1938; Gouws, 1957).

Some investigators have attempted to explain this superiority of the females. Furneaux (1961, 63) says that female students are far more highly selected in terms of home background than males. Lawry (1973) observed that females were more persistent than males. Packard (1973) concluded that female students are more efficient and accepted academic standards more willingly.

2.3.5.2 The Male Student a Higher Achiever at University

A few writers and researchers outside the United States have shown that at university the male student is superior academically to the female. Male pre-medical students in South Africa have proved to be superior to females in their examinations (Gouws, 1957; Brandford, 1961). Furneaux (1961, 234) observed that, whereas men were more likely to fail examinations than women, they were, however, more likely to obtain first-class honours degrees.

2.3.5.3 No Difference in Performance Between the Sexes

Baard (1956) and McCook (1973) were not able to establish significant differences between the academic performances of the two sexes in their studies In a national survey Iffert (1957) found that the drop-out rates between the two sexes showed no significant differences.

2.3.5.4 Conclusion

The evidence offered by the literature reviewed by the writer makes a strong case for the female student as a better performer in university examinations.

2.3.6 Study Facilities

2.3.6.1 What is Meant by Study Facilities

Study facilities refer to the physical conditions of the home or place of residence of the student, and the study environment in which he finds himself. The study environment will include people at home, neighbours, vehicular traffic, etc.

2.3.6.2 Poor Study Facilities Hamper Achievement at University

While the literature on this factor reviewed by the writer was not considerable, much of it supports the contention that inferior study facilities are a handicap to a student at university.

Poor study conditions was given as one reason for failure by first year university students in Australia (Olsen, 1957) and England (Malleson, 1959).

2.3.6.3 Socio-Economic Status and Study Facilities

Study facilities in the context of this investigation is related to socio-economic status. Poor socio-economic status means, *inter alia*, inferior study facilities, overcrowded homes, rowdy neighbourhoods.

Students from good neighbourhoods prove to be superior in academic attainment (Sumner, 1974, 39). Students from well-educated, professional, small families achieved better results at university (Furneaux, 1961, 109).

2.3.6.4 Research Evidence on Size of Family and University Achievement

Some researchers have shown that the size of the family to which the student belongs correlates negatively and significantly with performance at university (Mazzoni, 1971; Worthington and Grant, 1971, 7; Cochran, 1974).

South African studies have revealed that Indian homes are generally overcrowded thus providing conditions that are not congenial for fruitful study (Behr, 1965, 35; Maharaj, 1968, 41).

A few researchers have not been able to support the thesis that family size influences achievement at university (Himmelweit and Summerfield, 1951; Hopkin Malleson and Sarnoff, 1958).

2.3.6.5 Conclusion

Most of the evidence reviewed supports the contention that study facilities,

as defined in this investigation, influence academic attainment at university. Better study facilities result in higher achievement.

2.3.7 Commuter Time

2.3.7.1 Definition of Commuter Time

Commuter time is the time taken by a student for the single journey from his home or place of residence to the university.

Only a limited amount of research is available on the relationship of this factor to achievement at university level.

2.3.7.2 Commuter Time Important for Success at University

Excessive travelling has been found to affect adversely the performance in examinations of university students. This hypothesis has research support from Great Britain (Forster, 1959; Malleson, 1959), Australia (Olsen, 1957; Priestly, 1965), India (Sinha, 1966) and the United States (Summerskill, 1962).

It must be borne in mind however that time, as a factor, is probably intertwined with other intervening variables. Many students who take longer to travel, live in rural areas or live in homes located in the poorer socio-economic areas. Thus, socio-economic factors are also involved in time.

In a drop-out study Astin (1964) found a significant difference between the tendency to drop out between commuting female students when compared with resident female students. There was, however, no such significant difference for male commuting students.

2.3.7.3 Commuter Time has No Effect on University Achievement

The only dissenting voice to the hypothesis that commuter time affects academic achievement adversely is that of Berg (1973). From a freshman drop-out study he concluded that travel obstacles like distance and time are overcome by motivation and do not contribute significantly to drop-out.

2.3.7.4 Conclusion

Most of the evidence in the literature reviewed comes out in support of commuter time as a factor that contributes to achievement at university.

2.3.8 Part-Time Commitments

2.3.8.1 Definition of Part-Time Commitments

Part-time commitments comprise:

(a) part-time work, unrelated to a student's studies, and for which he is paid and

(b) part-time help, also unrelated to his studies, and for which he is not paid.

The hypothesis in question is whether students who have part-time commitments during the university academic year find that these commitments interfere with their academic performance.

2.3.8.2 The Importance of Proper Scheduling of Time

The amount of time spent on university work can be a significant predictor of achievement (Harding, 1974). The student must allocate time judiciously so that he does not undermine his academic tasks. The amount of study time, use of library and the even distribution of study time are important for success (Hammond, 1957; Harding, 1974).

2.3.8.3 Part-Time Commitment not Important for Achievement at University

Only a limited amount of research on this factor was available. However, there appears to be agreement that part-time commitment is not significantly related to academic achievement at university (Kinsey, 1972; Melicher, 1973; Thomas, 1974).

2.3.8.4 Part-Time Commitment and Other Intervening Factors

The confounding of part-time work with other related factors has prompted some researchers to investigate these intervening variables. Merritt (1974) inferred that students who work less on part-time work were more likely to be persistent. Sumner and Warburton (1972) postulated that students' spending habits were related to parental attitudes. Holmes (1968) found that ex-servicemen performed significantly better than other students in their examinations although ex-servicemen were more likely to be employed part-time and for longer hours. Of course, the question is whether part-time work itself is the over-riding factor; or whether it is the greater maturation and motivation of ex-servicemen who desire strongly and work responsibly towards, a university qualification.

2.3.8.5 Conclusion

The evidence on the influence on achievement of part-time commitment is not sufficient to make reasonable conclusions. It is evident, however, that it is not a "pure" factor and that inferences have to be made with caution. Academically superior students or motivated, mature students can generally pursue part-time work without prejudice to their studies.

2.3.9 Career Aspirations

2.3.9.1 What is Meant by Career Aspiration

Career aspiration refers to a student's expressed level of aspiration for teaching as a career.

UNIVERSITY OF DURBAN WESTVILLE LIBRARY

2.3.9.2 Career Aspirations and Social Mobility

Both in South Africa and elsewhere there has been a growing demand for tertiary education. In most communities, the aim is to obtain a college or university education and not be satisfied with a mere school-leaving certificate. Working class people in particular aspire to tertiary education

because it is the gateway to a satisfying and respectable status in life (Beardslee and O' Dowd, 1962, 599; Lispet and Bendix, 1962; Summerskill, 1962, 641; Lavin, 1965, 37).

2.3.9.3 Career Aspiration and Academic Achievement

The university student's realization that a profession will guarantee a given mode of life results in a greater application to his studies. This results in higher academic attainment. Positive relationships between career aspirations and achievement were reported by Lavin (1965) and Banks and Finlayson (1973, 122).

2.3.9.4 Career Aspirations, Goal Directedness, Commitments and Academic Achievement

Linked with career aspirations are goal-directedness, commitment, and persistence. Students who have committed themselves to a career are goal-directed and more successful in their studies than uncommitted students (Douglas, 1964; Lavin, 1965).

2.3.9.5 Career Aspiration and the Parent

Students who have been compelled or induced by their parents to take a profession have often proved to be less successful (Sandford, 1962; Sanders, 1963; Astin, 1964). The literature reviewed shows that the status level of the parent is related to the career choice and academic performance of the off-spring. Higher status-level parents had sons and daughters showing high aspirations for high prestige occupations (Vernon, 1963; Lavin, 1965, 126). Higher career aspirations are associated with higher achievement (Lavin, 1965, 71).

2.3.9.6 Conclusion

High student aspirations for a chosen career appear to promote more successful study. Parental influences in the choice of a student's career

are often evident but the effect on the student's achievement is still an open question.

2.3.10 Residence

2.3.10.1 Meaning of Residence

Residence refers to the place of abode of the student while studying at university. It can be the student's home, a private lodging or the university hostel.

2.3.10.2 The Influences on Students of University Residence

Entrants to university residences may find their entry to higher education cushioned or they may rebel against it. Some students "find" themselves when they are on their own in university residence away from their family and friends. Such students are inclined to perform better academically (Bay, 1962, 999). There are others who feel lonely in the new surrounding and suffer emotionally and academically as a result (Bloom *et al*, 1961, 120).

2.3.10.3 Students in University Residences do Better Academically

Many researchers support the postulate that university residences offer educational advantages superior to other kinds of accommodation like the home or private lodgings (Sprague, 1968; Hountras and Brandt, 1970, 351).

The Robbins Committee on Higher Education in Great Britain (1963) reported that except for Oxford, Cambridge and London, all British universities showed that home-based students least often sat examinations. Further, Oxford and Cambridge resident students obtained a higher proportion of first and second class passes than students in lodgings. Two Australian studies, one by Langley (1968) and the other by Anderson and Priestley (1965), contended that resident students performed better academically than students in lodgings or at home.

2.3.10.4 University Residences Reduce Academic Achievement

A few researchers have not been able to endorse the educational advantage of university residences. Rago (1969) blames the hotel-like structure of dormitories which discourages inter-personal contact and encourages isolation. Further evidence that students in university residences produ academic performance which is inferior to that of non-residents, comes fr Suddarth (1957), Howell (1964) and Marris (1964).

2.3.10.5 Type of Residence is Not Important for Success at University

A few investigators have failed to obtain meaningful relationships between types of residence and academic achievement. They reported no significant differences between the two variables (Harris, 1940; Hopkins *et al*, 1958; Prusok and Walsh, 1964; Oxtoby, 1967, 44).

2.3.10.6 Conclusion

The research evidence on the effect of the type of student residence on university achievement is inconclusive.

2.3.11 Financial Aid

2.3.11.1 What is Meant by Financial Aid

Financial aid refers to monetary assistance, in the form of outright awards or repayable loans and bursaries, to able or indigent students who would otherwise find it difficult or impossible to attend university.

2.3.11.2 Financial Problems Affect Academic Achievement at University

Financial problems constitute a difficulty faced by first year university students the world over (Olsen, 1957; Priestley, 1957; Howell, 1962). A number of United States studies have revealed that financial difficulties are an important cause of failure in university examinations (Summerskill, 1962, 846). Higher education is open largely to those who can afford it.

The availability of money, whether from family income or from bursaries, is a determining factor (Miller, 1970; Russ, 1973).

Statistical rigour accompanies some of the literature reviewed. Significan positive correlations between academic achievement and finance were reporte by Flook and Saggar (1968, 395) and Worthington and Grant (1971, 7).

2.3.11.3 Financial Problems do Not Affect Achievement at University

Some research evidence does not endorse the thesis that financial problems result in reduced achievement. Financially distressed students work part-ti while studying at university and sometimes perform better than their fellow students who do not work part-time (Astin, 1971, 14).

2.3.11.4 Financial-Aid Recipients and Academic Performance

Some of the research evidence reviewed reveals that financial aid results in lower achievement (Knight, 1968; Bayer, 1971; Dixon *et al*, 1972). They found that loan recipients were more inclined to drop out, and inferred that the need for financial assistance appeared to decrease academic aspiration.

Other studies report differently. In investigations by Snyder (1971) and Winder (1972) no significant differences were obtained between the performanc of the students receiving financial aid and those not receiving aid. Sandford (1962, 645) maintains that financial problems are overcome to some extent by scholastic ability and motivation.

2.3.11.5 Conclusion

From the evidence of the literature reviewed it would appear that finance is a factor that cannot be ignored in tertiary education. But meeting the financial difficulties alone does not solve the problem; matters of scholarship and motivation are also involved.

CHAPTER THREE

3. SELECTION OF FACTORS AND STUDENTS FOR THE PRESENT STUDY; SELECTION, CONSTRUCTION AND ADMINISTRATION OF INSTRUMENTS

3.1 SELECTION OF FACTORS

As a result of the review of the research literature described in Chapter Two, several changes were made to the original list of seventeen factors chosen with the assistance of Faculty colleagues. These changes are discussed below.

Certain factors were omitted from the present study. Family conflict and family income were discarded because these factors were regarded as rather personal and private. It was the intention of the writer to avoid inquiries of a controversial nature. Size of family as a factor was also excluded as the literature reviewed by the writer did not support it sufficiently. Three further factors that were omitted were: study methods, academic adjustment and persistence; because appropriate measuring instruments were neither easily available nor easy to construct.

Four new factors supported by the review of the literature, and whose measurement was fairly straightforward, were included for this study. These were: sex, financial aid, part-time commitments and age.

"Distance from universtiy" was amended to "Commuter time", as it was felt that the latter was a more accurate index of the concept to be studied.

The factors eventually selected for the present investigation, based on

the questionnaire to Faculty members and the research literature reviewed are discussed below.

3.1.1 Psychological Factors

3.1.1.1 Scholastic Aptitude

There is overwhelming evidence that selection procedures employing scholastic aptitude tests are more valid than those that do not. In the United States, Bloom and Peters (1961, 61) report an improvement in prediction correlation from 0,50 to 0,72 when scholastic aptitude scores are considered in addition to high school achievement. In Great Britain, the Vice-Chancellors' Committee commissioned research into the development of scholastic aptitude tests (Miller, 1970, 229); while other well-known researchers have emphasized the importance of scholastic aptitude for university achievement (Eysenck, 1947; Furneaux, 1961, 132). This basic factor was therefore selected as one of the variables for this study.

3.1.1.2 High-School Achievement

Numerous studies dealing with cognitive variables have consistently reported significant relationships between high-school achievement and first-year university performance. It has been repeatedly demonstrated that of all the measures used in predicting university achievement, high-school achievement has emerged as the best (Chapter Two, p. 15). This applies to many countries, including the United States (Astin, 1971, 5), United Kingdom (Miller, 1970, 100) and South Africa (Brandford, 1961). Therefore, there was no hesitation in including it for purposes of investigation.

3.1.1.3 Extraversion and Neuroticism

Factor-analytic theorists of personality like Cattell in the United State: and Eysenck in Great Britain, have offered a scientific theory of personality in which unitary patterns of personality could be demonstrated by measurement and calculation. Cattell and Butcher (1967, 59) reported that independent factor-analytic studies of the results of Cattell's 16 Personality-Factor Questionnaire translated into nine different languages, including Hindi, and administered across three continents, showed that essentially the same factors exist in these cultures as in British and American cultures. In a study of extraversion, neuroticism and academic achievement in Uganda, Honess and Kline (1974, 4) obtained results essentially similar to those obtained with British students. Dimensions of extraversion and neuroticism seem to be present in all systematic dimensional studies of personality (Brody, 1972, 190). Since Eysenck is credited with coming closer to understanding the form of a generally satisfactory, factor-analytic, scientific theory of personality (Brody, 1972 his major dimensions of extraversion and neuroticism were selected for the present study. Further, Behr (1974, 15) has administered Eysenck's tests for extraversion and neuroticism to a group of first year Durban-Westville students and regularly to those in need of counselling. Her findings offer a background for this study.

3.1.1.4 Interests

The literature has revealed conflicting findings in respect of interests and academic performance (Chapter Two, p. 22). Behr (1972, 1) reports that parental advice was more important than any other factor in the career choice of students at the University of Durban-Westville; less emphasis is placed on the student's innate interests and other important factors. Banks and Finlayson (1973, 52) report that a large number of studies have shown

that parental aspirations for their children are positively related to achievement. Indian parents are, like parents in disadvantaged communities or classes anywhere else in the world, strongly aware of the value of educational qualifications in achieving a respectable and satisfying status in life. Commitment could supersede interest as motivating factor in such cases. It was decided to measure the interests students in the present investigation and to study their influence on achievement.

3.1.2 Sociological Factors

3.1.2.1 Commuter Time

The literature on this variable is limited. However, with one exception, researchers have all supported the thesis that excessive travelling adversely affects academic performance (Chapter Two, p.31). With the university residences at Durban-Westville being able to accommodate only 474 students, the remaining students out of an enrolment of 2 674 have to travel to the university daily by bus, car, train, or foot. With 84% of the Indian population living in Natal and 90% of them within an 80 km radius of Durban (Reddy, 1976) the majority of students commute between the university and their homes. A small number live in private lodgings. Students usually find it cheaper to travel long distances from their homes than to live in lodgings close to the university. Long distances, a poor bus service, and the cumbersome combination of bus and train for single journeys, consume valuable time which would otherwise be available for study purposes. There was little hesitation in including this variable for the present enquiry.

3.1.2.2 Parent's Education

Consensus of opinion among researchers in Western societies is that there

is a positive correlation between parent's education and a student's academic performance (Chapter Two, p. 22). Behr and Behr (1965, 34) in a study of the proficiency and background factors of first-year B.A. and B.Sc. students found a very low level of Western education among Indian parents. Less than 18% of the fathers had studied up to or beyond standard eight. The figure for mothers was only 4%. This situation is no unexpected when it is realised that the first indentured Indians arrived in South Africa as recently as 1860 and 75 years later (1935) only 391 pupils (1,5% of total school population) were engaged in post-primary work (Naidoo, 1952). It is only in recent decades that secondary and tertiary education have become available on a more generous basis. In 1973, attendance for Indian pupils entering Class One became compulsory (Act 61 of 1965). In 1975 out of a total school population of 183 348 pupils, 68 890 were in secondary classes (Pillay and Naguran, 1976, 18).

Further, because of the traditional disregard for the education of their daughters and the strong conservatism among Indian parents, which was opposed to educating girls, females constituted a very small percentage of the school population (Naidoo and Perumal, 1976). These circumstances have altered considerably. In 1975 girls comprised 49% of the primary school population and 43,06% of the secondary school population (Pillay and Naguran, 1976, 18). The mothers of these girls, however, possess inferior educational qualifications. What effect does such mothers' education have on academic performance? In order to answer this, the education of the mother was selected for study in addition to that of the father.

3.1.2.3 Parent's Occupation

Traditionally, the Indian father was the breadwinner; while the mother's duties were in the home. This was the main reason why-until about

thirty years ago-it was generally the male that sought formal Western education and not the female. However, with the establisment of better higher education facilities for Indians in recent years and the inculcatic of a Western-oriented outlook on life, more and more women are developing a high level of career-mindedness (Jithoo, 1975, 59).

While most parents are to be found at the lower socio-economic levels, a small percentage has risen to the very top. Jithoo (1975, 55), in her study of a hundred families in Durban, found that they represented many diverse occupations ranging from unskilled labourers to professional persor A wide range in the occupational levels of the fathers was expected in the present study. With a high percentage of Indian families living below the poverty datum line (Booyens *et al*, 1973, 29) it is expected that most Indian parents will be in the lower occupational levels. Modern industrialisation and better education have offered Indian women more economic freedom and many of them work, thus heralding an era of improvement in living standards (Naidoo and Perumal, 1976). Both the extent and the influence of the mother's occupation are worthy of investigation. Thus the mother's occupation was also included as a variable in addition to father's occupationa.

3.1.2.4 Study Facilities

Poor study facilites are a natural concomitant of low socio-economic status. Lamond and Watts (1963, 29) calculated that 63,7% of the Indian population lived below the poverty datum line in 1961. Eight years later Muller (1973, 29) put the figure at 70%. Sugden (1972, 67) in a social and economic study of Chatsworth found that 27% of the homes contained more than the planned number of residents. Over-crowding is a problem of some significance in many Indian homes. The extended family system

encourages large households and domestic conditions that are not conducive to study. Much of the literature on study facilites supports the hypothesis that a favourable environment enhances academic performanc (Chapter Two, p. 30). Those Indian students, handicapped by poverty, overcrowding and other socio-economic handicaps, should therefore be achieving lower. Or do they overcome these odds by persistence and application? To answer this question, the topic of study facilities was included for investigation.

3.1.2.5 Home Regime

The literature supports the hypothesis that achieving acholars appear to come from homes where there is freedom of thought and communication among the members, with harmonious and stable parents who are interested in the academic careers of their sons and daughters (Chapter Two, p. 25). These attributes are characteristic of most Indian homes. However, with the gradual decay of the joint family system where the patriarch, by tradition, held authority, the nature of home regime amongst Indians is expected to show signs of change. Jithoo (1975, 56), in her study of 100 Indian families in Durban, found that only 35 were of the joint-family type. It would thus appear that this development towards nuclear family units is becoming more pronounced. Occupational differentation and Western education are two reasons she offers for the change. It was decided to investigate home regime as a factor in order to ascertain its present nature and to see if it substantiates the findings of Western studies.

3.1.2.6 Part-Time Commitments

Research with this variable is limited, and the evidence is contradictory (Chapter Two, p. 32). Like students elsewhere, those of Durban-Westville are

inclined to accept part-time employment in order to supplement pocket money to defray study expenses and for other purposes. Some students are involved part-time in family undertakings and receive no renumeration. With long distances to travel, poor socio-economic conditions to contend with, part-time commitments are expected to add to the factors that undermine the achievement of many students. This factor was selected for investigation.

3.1.2.7 Age

The review of the research literature in the previous chapter has offered inconsistent evidence on the influence of age on academic performance. Some have supported the hypothesis that younger students perform better than older students. Others believe the reverse is the case. Students admitted to the University of Durban-Westville in the first year are, with few exceptions, young students who had matriculated in the previous year. To clarify the issue with these students, this factor was included for study.

3.1.2.8 Sex

Almost without exception, overseas findings have shown that women in Western societies achieve better grades than men at university (See (Chapter Two, p. 28). Women in Western cultures have a long association with school and university education. In South Africa, it is only in recent years that Indian girls have seriously competed in high school and tertiary education with Indian boys who had dominated the educational scene for a long time.

Previously Indian women were by tradition not expected to need formal education as their duties were at home, where they cared for their children

and attended to household duties.

It would be very interesting to see if the Western female's academic superiority is sustained by the girls who in 1975, numbered 794 out of a total of 2 674 at Durban-Westville. Sex was selected as a factor for the present study.

3.1.2.9 Financial Aid

University education is available only to those who can afford it, unless the student is a recipient of a susbstantial bursary. Watts and Lamond (1963) in a report for the Natal University Institute of Social Research reckoned that only 1,4% of the Indian population was affluent; while Pillay and Ellison (1969) calculated that the average Indian household expenditure exceeded the poverty datum line of R72,73 per month per household of 6,9 persons by R11,80. Bursaries awarded by the Department of Indian Affairs to prospective teachers enable many students to pursue a career at university which would otherwise be beyond their reach. Research has shown that, generally, students without financial worries perform better academically (Chapter Two, p. 36).

It was felt pertinent to ask whether the bursars performed better or worse than non-bursars. It must also be borne in mind that among the non-bursars are many students for whom a university education is possible only because their parents and families have decided to make sacrifices to enable the youngsters to study further. Financial aid was therefore included as a variable.

3.1.2.10 Residence

Sandford (1962, 999) postulates that university residences offer academic and social facilities which produce a better intellectual climate. Home-base Indian university students often suffer many handicaps. Booyens *et al*,

(1973, 44) in their study of Indians in the Chatsworth township found the nutrient intakes of all age groups and sex groups were markedly lower than the minimum daily intake levels recommended by the South African Nutrition Council. Under-nourishment undermines health and academic effort. Students in university residences are not expected to be similarly affected because of the anticipated quality and balance of the meals provided. Further, resident students have near optimum study environments and facilities. In 1975, of the 2 674 students enrolled in Durban-Westville, 474 were in the three residences. Thus it was decided to include residence as a factor for this study.

3.1.2.11 Teacher-Career Aspiration

All students in the Faculty of Education are committed to teaching as a career. Behr and Behr (1965, 36), in their study of first year Indian students, found that only 20,59% of the B.Sc. Group had a preference for teaching as a career. Higgins (1970, 39), in a random sample of Durban-Westville students, found that only 31% contemplated teaching as a career. He also inferred that nearly half the students manifested inconsistent occupational patterns, i.e. no balance between realism of expectations, career plans, ambitions, on the one hand; and the chosen course of study on the other. It would appear, therefore, that not all students taking up teaching give it a high rating as a career choice. Behr (1972, 6) reported a significant correlation between occupational preferences of parents and occupational choices of students at the University of Durban-Westville. Only 26,71% of fathers and 29,47% of mothers did not influence their sons in their occupational choice. Hopkins *et al* (1958) found that more students who failed had their choice made in response to strong parental aspirations rather than being genuinely free. It was decided to study the effect on academic performance of the level of aspiration for teaching as a career.

3.2 SELECTION AND CONSTRUCTION OF INSTRUMENTS

Research has a major purpose which is to introduce a degree of certainty to knowledge which hitherto has been imprecise (Sumner, 1974, 4). To achieve this greater precision the researcher relies on properly constructed assessment instruments which have a special value in being relatively free of disturbing effects such as researchers' bias, fluctuations in quality of questions or of scoring to preconceived standards (Sumner, 1974, 9). The advantage of objective data obtained from valid and reliable measuring instruments is that precise tests of significance can be applied through the use of appropriate statistical treatments (Sumner, 1974, 26).

With reference to the present study, it must be emphasized that granting or refusing admission to university and the passing or failing of examinations have important consequences for the student. These consequences make it imperative that we have good estimates of the probability of academic success. Reliable estimates can only be made from reliable evidence which, in turn, is more likely from good instruments. Where such instruments recommended themselves for certain factors they were selected. The remaining factors were measured by a specially constructed instrument.

3.2.1 Selection of Instruments

3.2.1.1 Criterion : Academic Performance

In studies of academic achievement the traditional criterion of performance is the students' examination marks (Lavin, 1965, 14; Nuttall and Willmot, 1972, 145). The criterion performance is the achievement of the student in the examination; while the criterion score is the examination mark or symbol. For the present study the end-of-year

examination of 1975, set by the University of Durban-Westville, was the instrument used to measure the criterion.

3.2.1.2 Scholastic Aptitude

Standardised scholastic aptitude tests have not been developed for Indian South African university students. What was preferred for this study was a standardised, reasonably short test that could be easily administered. In the absence of such a test, Test A/1/2 of the National Institute for Personnel Research of the Council for Scientific and Industrial Research, South Africa, came close to meeting these requirements. This test has been standardised for South African students: it measures verbal meaning, abstract reasoning, numerical ability and spatial ability. These are regarded as primary ability factors (Bloom and Peters, 1961, 28; Cattell and Butcher, 1968, 36).

However, while the test measures these factors it does not yield subscores for each factor. It produces a global score, i.e. a single overall measure of ability. Since the subjects of this study were non-graduate males and females who had recently matriculated, the test recommended itself for use.

3.2.1.3 High-School Achievement

It is widely accepted that school leaving examinations provide the most useful and accurate information of the academic quality of the student (Astin, 1971, 7). A — level scores in Great Britain and matriculation or equivalent marks in South Africa have proved to be the best predictor of freshman achievement (Brandford, 1961, 39; Lavin, 1965, 52; Iliffe, 1968, 13).

Therefore, the 1974 Senior Certificate Examinations were taken as instruments to provide measures of high school achievement. All first-year

students had written these examinations prior to coming to university. (It should be noted that the 1974 Senior Certificate Examinations were the last ones under the old differentiated basis of Advanced and Ordinary streams). From 1975 onwards the Senior Certificate Examinations were written under a new system of differentiation where new syllabuses in the subjects prescribe the contents at a "Standard level" and at a "Higher level", and students are required to pass approved combinations of subjects, either all at Higher level or some at Higher level and some at Standard level to qualify for admission to university.

3.2.1.4 Extraversion and Neuroticism

The Eysenck Personality Inventory which is for persons over 17 years of age was chosen. This Inventory consists of two equivalent forms A and B. Each form has 57 questions: 24 question test extraversion, 24 neuroticism and 9 constituted a lie scale. "Personality Questionnaire Form A" compiled by H.J. Eysenck was selected. The Eysenck Personality Inventory measures the personality dimensions of extraversion and neuroticism. The extraversion and neuroticim scales are constructed to yield numerical scores with two validity criteria satisfied. Units are equal to all parts of the scale and measurement starts from zero point (McLeish, 1970, 32).

The Eysenck Personality Inventory is a short reliable and valid instrument (Eysenck and Eysenck, 1970; Farley, 1971, 364). It has been used extensively in Great Britain. Lowe and Hildman (1972, 191) have used it with black and white students in the United States. Mehryar (1970) and Mehryar *et al* (1973) have applied local versions of the Eysenck Inventory to Persian students. Orpen (1972) and Behr (1974) have used these instruments in South Africa.

3.2.1.5 Interests

An instrument was sought that measured inventoried interests by using statistically treated statements from which scores are derived (Behr, 1976, 179). The instrument selected was the Occupational Interest Guide of the Applied Psychology Unit of the University of Edinburgh (Closs, 196

It was designed to yield an assessment of the relative strengths of a person's interests in eight directions: scientific, social service, literary, artistic, computational, practical, clerical/sales and outdoor.

The guide consists of 2 booklets, one for males and one for females. Each guide consists of 224 job activity descriptions grouped into 112 pair There are 28 job activities for each of the eight directions mentioned above.

3.2.2 Constructions of Instrument : Biographical and Sociological Inventory

Data relating to the remaining factors selected for this study were obtained from student's responses to a questionnaire — type instrument. This was specially constructed for this purpose and was named the "Biographical and Sociological Inventory"(See Appendix A).

Although questionnaire-type instruments are not strong in terms of reliability and validity, (Goodenough, 1960, 406; Vernon, 1965, 122; Behr, 1973, 80) they are nevertheless used extensively, with more than 50% of research studies in education employing them (Good, 1963, 271). Questionnaires, if well constructed, can under suitable motivating conditions be of value for experimental research (Vernon, 1965, 143).

Questionnaires are not necessarily restricted to questions only.

Ratings, check lists and rankings may be included (Behr, 1973, 73). They have been used profusely for the appraisal of personal- social characteristics (Goodenough, 1960, 406).

Many items for the inventory constructed were initially derived from published and unpublished sources on the basis that they were carefully prepared and in some cases previously standardised on large populations. Relevant details will be given in the next chapter. The Inventory required from the students information relating to age, religion, linguistic group, sex, courses taken in first year, place of residence, nature of travel, distance from university, time taken to travel to university, parent's occupation, career aspiration, home regime and part-time commitments.

Most of the items were of the closed type which facilitated answering and also made coding and classifying of responses easy. The questionnaire itself was brief with items numbering a little over 30, which is regarded as optimal (Lovell and Lawson, 1970, 94).

The draft inventory was circulated amongst colleagues in the Faculty of Education for their scrutiny, criticism and suggestions. Their views generally, appeared well-informed and their observations were noted and many incorporated into the items concerned. As a result the inventory items achieved a greater measure of simplicity, brevity and lack of ambiguity, which are desirable characteristics (Behr, 1973, 74). The contributions of colleagues also ensured a measure of internal validity (Sumner, 1974, 4) for the inventory when it was administered to students in its final form.

It was decided to ask the respondent to give his name, as many researchers believe he would reply in a more responsible way if he appended his signature to the inventory (Fisher, 1952, 87; McLeish, 1970, 29).

3.3 SELECTION OF INDIVIDUALS

It was believed that the present investigation was the first serious, statistical, analytic attempt to investigate academic performance amongst students at the University of Durban-Westville. It was decided not to cover all 2 674 students of the university in this investigation. Such an attempt was regarded as too complex, arduous and ambitious, especially in view of the fact that the students were spread over different years of study and across five faculties and more than 50 departments. Since it is an established fact that the highest rate of failure is in the first year at university it was decided to confine this investigation to first-year students.

Researchers have also stressed that predictive techniques must be developed on a departmental basis as precision is lost when formulae are applied to groups unlike the one from which the formulae were derived (Miller, 1970, 5). The literature also recommends that for more reliable results, investigations should be undertaken within curricular groupings (See Chapter One, p. 7). It was decided, therefore, to confine the study to a single faculty. In view of the fact that the writer is a member of the Faculty of Education, it was an obvious decision to choose first-year students in the Faculty of Education as subjects for this study. The students selected were in their first year of study for the academic year 1975.

3.4 ADMINISTRATION OF INSTRUMENTS

With the much appreciated permission of the Faculty of Education and the kind co-operation and assistance of certain members of staff and second-year students, the following instruments were administered: The National Institute for Personnel Research Test A/1/2; The Eysenck Personality Inventory Form A; the University of Edinburgh Occupational Interest Guide and the Biological and Sociological Inventory. They were administered over a period of two weeks early in the second semester of 1975.

The instruments were administered to the following subgroups which comprised the first year students in the Faculty of Education:

(a) University Diploma in Education, Senior Primary – This is a group taking a full-time three-year course of academic and professional preparation for teaching a wide range of subjects in the Senior Primary schools (*University of Durban-Westville Calendar*, 1975, 195).

(b) University Diploma in Education, Junior Secondary – This is a group taking a full-time three-year course of academic and professional preparation for teaching in two specialised subjects in the Junior Secondary schools (*University of Durban-Westville Calendar*, 1975, 198).

(c) Bachelor of Paedogogics – This group pursues a full-time four-year degree course with integrated development of academic and professional preparation for students

> desiring to teach in the Secondary, Senior Primary or Junior Primary classes *(University of Durban-Westville Calendar*, 1975, 185).

Students were told about the nature of the investigation and given the assurance that their responses were confidential as it was believed that such steps help to motivate the students to respond more accurately (Behr, 1973, 73).

Only those students who took all the instruments administered were finally selected for the study. The final number was 134 students: 35 Senior Primary, 57 Junior Secondary and 42 Bachelor of Paedogogics.

CHAPTER FOUR

4. ANALYSIS OF DATA AND INTERPRETATION OF RESULTS

This chapter, like the next one, analyses the data yielded by the instruments discussed in the previous chapter.

4.1 STATISTICAL PROCEDURES EMPLOYED

This empirical study on factors affecting academic achievement was undertaken across a broad psychological and sociological front. It gathered a considerable amount of data in numerical form, from which inferences had to be sorted out.

In studies of this nature two principal designs are available: the longitudinal and the static (Lavin, 1965, 45). In the longitudinal design performance is studied at several points in time. In the static design performance is examined at one particular point in time. The static design was chosen for the present study. Most of the studies on academic achievement are of the static design and use empirical procedures which have largely replaced the old approach which, according to Cattell and Butcher (1968), is based on literary insights built upon a large but relatively unsystematized body of intuitive knowledge.

The statistical procedures selected for the investigation were: frequency distributions, analysis of variance, chi square and correlational analysis.

The precision with which inference can be made from correlational analysis depends upon the use of data obtained from random, normally distributed

observations (Boone, 1966, 30). Therefore, it was decided to prepare frequency distributions of the scores for each variable. This would enabl the present writer to ascertain the extent to which the distributions were normal. Further, when dealing with large masses of raw data, it is desirable to summarise the facts into a more homogeneous form so that the human mind is able to gain an overall picture and also grasp vital relationships (Pearson and Bennett, 1942, 1; Steele and Torrie, 1960, 26; Spiegel, 1972, 27). According to these writers the frequency distribution table is one of the best condensed summaries of data that can be made. If properly constructed, it will show most of the characteristics of the original data.

For each factor in the present investigation frequency distribution tables were drawn for the following groups of students:

(i) Senior Primary (SP)

(ii) Junior Secondary (JS)

(iii) Diploma (DIP) - these comprise Senior Primary and Junior Secondary

(iv) Bachelor of Paedogogics (B.Paed)

(v) Total - these comprise all students in the study: Diploma and Bachelor of Paedogogics (TOTAL)

Besides frequency distributions, the mean and standard deviation for each group was computed.

The standard deviation is a measure of the extent to which scores are spread across a given sample (Sumner, 1974, 29). Of all the measures of variability, the standard deviation is by far the most widely encountered (Downie and Heath, 1970, 56). Its greatest value has been in the analysis

of relationships amongst variables where it measures the degree of variability among observations (Pearson and Bennett, 1942, 304).

Further, the variability of a group, expressed in terms of either standard deviations or variances, should be reported when correlation coefficients are calculated. This gives some information on the nature of the group from whom the data were compiled and aids greatly in interpretin correlation coefficients (Downie and Heath, 1970, 101).

The means of the scores of the various groups were calculated in order to test their difference for significance. The mean was not calculated by the formula for grouped data, but from discrete scores. This ensured a more accurate figure for the mean. The difference between group means is a commonly used method of analysis (Summer, 1975, 29). For this, two tests were considered: the t test and the F ratio (Analysis of Variance). Both can be used to test the difference between two means and the results are exactly the same (Pearson and Bennett, 1942, 356). From the standpoint of ease of calculation both are equally difficult but the F test is more versatile, more efficient and gives more complete information (Pearson and Bennett, 1942, 369). This was one reason why the Analysis of Variance (F Ratio) was chosen by the present writer to test the significance of the differences between means. Another reason for the choice was that the summations of scores and summations of squares of scores, both of which are needed for the calculation of the F ratio, were available from the computations of Pearson r coefficients made by the Burroughs 5700 computer. This reduced appreciably the amount of computation when the F ratio was calculated with an electronic hand calculator. The computation comes under various specialised headings (See Appendix B2).

Where differences between proportions had to be tested for significnace,

the chi square statistic which is distribution free, was employed (Downie and Heath, 1970, 208; Spiegel, 1972, 201).

It was decided not to compare all pairs of means for each variable. Sumner (1974, 37), states that test measures will contain errors due, *inter alia* to scoring, misunderstood instructions, dated items, mistakes in responding. No measure is exact. Therefore, says Sumner, we can appreciate that small differences may indeed be inconsequential. In this study means whose differences were slight were not compared statistically.

The correlational analysis will be discussed in the following chapter.

The present chapter describes and discusses, for each factor studied, the frequency distribution and the mean and standard deviation for each group: SP; JS; DIP; B. PAED and TOTAL. The percentage for each frequency of the Total was also computed. The analysis of variance (F ratio) and chi square results are discussed.

4.2 FREQUENCY DISTRIBUTIONS, ANALYSIS OF VARIANCE/CHI SQUARE AND INTERPRETATION

4.2.1 Academic Performance

The examination mark for each subject taken by the students was obtained from the records kept by the Faculty of Education. These scores were given as percentages. The percentages were converted into quality points in accordance with the following table.

TABLE 4.1

TABLE FOR CONVERTING EXAMINATION MARKS (%) INTO POINTS

PERCENTAGE	POINTS
< 40	0
40 - 44	1
45 - 49	2
50 - 54	3
55 - 59	4
60 - 64	5
65 - 69	6
70 - 74	7
75+	8

In studies of academic achievement the traditional criterion measure is the grade point average where the student's grades (scores or symbols in subjects examined) are converted into quality points and averaged (Lavin, 1965, 18; Daniëls, 1970, 61; Astin, 1971,). Therefore, the quality points for each student were summed and averaged to yield the criterion measure.

The scores ranged from 0,25 to 6,00. This range was divided into seven classes and frequencies were calculated for each class. See Table 4.2 below.

TABLE 4.2

DISTRIBUTION OF ACADEMIC PERFORMANCE SCORES

SCORES	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B.PAED	TOTAL	PERCENT (TOTAL)
0 - 0,99	0	0	0	2	2	1,493
1 - 1,99	0	0	0	5	5	3,731
2 - 2,99	2	10	12	10	22	16,418
3 - 3,99	13	16	29	17	46	34,328
4 - 4,99	16	21	37	7	44	32,836
5 - 5,99	3	9	12	1	13	9,701
6 - 6,99	1	1	2	0	2	1,493
N	35	57	92	42	134	
$\overline{X}$	4,076	4,016	4,038	3,000	3,713	
s	0,756	0,929	0,868	1,113	1,080	

The minor skews to the left displayed by the SP, JS and Diploma groups suggest a slightly superior academic performance by these students over the B.Paed.

The means for the various groups confirm the observation made above. The Diploma mean of 4,04 is greater than the B. Paed mean of 3,00. The analysis of variance test shows this difference to be significant at the 1% level (F = 33,84). (See Appendix B for an example of the calculation of F). As will be shown later, Test A/1/2 revealed no significant differences in scholastic aptitude between Diploma and B.Paed students. Therefore, the significant difference in academic performance of the two groups may be attributed, *inter alia*, to differences in teaching approach, subject content

and types of examinations. Diploma classes are taught by experienced classroom teachers. The classes are smaller than those of the B.Paed and this enables better remediation of weaknesses. While ability is important for success, achievement is also a function of how hard the student works (Miller, 1970, 54).

All seven students with mean scores below 45% were B.Paed. Twenty-nine students (21,64%) had failing mean scores. The B.Paed failure rate of 40% is comparable with findings at other universities (See Chapter One) – seventeen of the forty-two students had mean scores below 50%. The difference between the SP mean of 4,076 and the JS mean of 4,016 was not significant at the 5% level ($F < 1$).

4.2.2 Scholastic Aptitude

The NIPR Test A/1/2 has 65 items.

Raw scores, therefore, have a minimum of 0 and a maximum of 65. The raw scores were used directly in the analysis. The scores ranged from 24 to 50. Table 4.3 illustrates the distributions among seven levels of scholastic aptitude.

TABLE 4.3

DISTRIBUTION OF SCHOLASTIC APTITUDE SCORES

SCORES	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B.PAED.	TOTAL	PERCENT (TOTAL)
20 - 24	5	2	7	1	8	5,970
25 - 29	6	11	17	8	25	18,657
30 - 34	14	15	29	13	42	31,343
35 - 39	4	15	19	11	30	22,388
40 - 44	3	11	14	8	22	16,418
45 - 49	2	3	5	1	6	4,478
50 - 54	1	0	1	0	1	0,746
N	35	57	92	42	134	
$\bar{X}$	32,600	34,596	33,837	33,048	33,903	
s	7,029	6,003	6,484	5,773	6,270	

There was a minor skew to the right in the distributions of all groups. This implies that slightly more students are found among the lower scholastic aptitude levels. It must be remembered that the majority of these students hold the Senior Certificate without Matriculation Exemption. Therefore, in terms of proved academic achievement they belong to the lower half of the "matriculating" population.

Another feature was the small differences between the means of the various groups. The mean scores ranged from 32,60 for SP to 34,60 for JS. The B.Paed mean was 33,05. The B.Paed mean was lower than the Diploma mean of 33,84. Yet the B.Paed had performed significantly better in the matriculation examinations — as will be shown later.

Analysis of variance tests confirmed that the differences between the mean

scholastic aptitude scores were not significant at the 5% level i.e. there were no real differences among these groups in terms of scholastic aptitude as measured by the NIPR Test A/1/2.

4.2.3 High-School Achievement

High school achievement was obtained from the students' performance in th matriculation examination or its equivalent. Matriculation results are given in symbols for each subject and for the aggregate.

For the present study the symbols of the subjects were converted into quality points according to the following table:

TABLE 4.4

TABLE FOR CONVERTING MATRICULATION SYMBOLS INTO POINTS

SYMBOL	POINTS
A	7
B	6
C	5
D	4
E	3
F	2
FF	1
< FF	0

For each student the quality points for the subjects were summed and averaged to yield a score for high school achievement.

The scores ranged from 2,00 to 4,33. This range was divided into five categories. Table 4.5 shows the frequency distributions for the various

groups.

TABLE 4.5

DISTRIBUTION OF HIGH-SCHOOL ACHIEVEMENT SCORES

SCORES	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B.PAED	TOTAL	PERCENT (TOTAL)
2,00 - 2,49	6	5	11	1	12	8,955
2,50 - 2,99	17	29	46	2	48	35,821
3,00 - 3,49	11	16	27	11	38	28,358
3,50 - 3,99	1	7	8	17	25	18,657
4,00 - 4,49	0	0	0	11	11	8,209
N	35	57	92	42	134	
$\overline{X}$	2,790	2,873	2,842	3,597	3,078	
s	0,302	0,374	0,351	0,521	0,465	

The Diploma Groups reveal a slight skew to the right indicating that more students in this Group lie among the lower achievement levels. On the other hand the B.Paed distribution shows a small skew to the left, indicating superior academic achievement in the matriculation.

The inferences suggested by the skews were confirmed by the mean achievement scores. The Diploma mean of 2,54 was significantly lower than the B.Paed mean of 3,597. Analysis of variance test yielded on F of 103,88 establishing significance at the 1% level. The JS mean of 2,873 wa also significantly different from the SP mean of 2,79. An F value of 12,55 made this difference significant at the 1% level. This finding confirms to some extent the validity of selection procedures used by the Faculty of Education to channel the more academically promising Diploma students into following the Junior Secondary course and the less promising

the Senior Primary Course. Whether this practice is justifiable or not is another matter.

The superiority of the B.Paed is further evident in the fact that all eleven students with scores of 4,00 and above were B.Paed, while of the twelve students with the lowest scores only one was a B.Paed student.

We have noted already that while there was no significant difference in scholastic aptitude between the B.Paed and Diploma students, the B.Paed have performed significantly worse than the Diploma in the university examinations. If, as the research evidence has shown, the high school performance is the best predictor of achievement at university, then the B.Paed should have done better. The reason for their not having done better would seem to be due to factors discussed in Chapter Two, Section 2.

4.2.4 Extraversion

The maximum scores possible on the Eysenck Personality Inventory Form A for extraversion is 24 and the minimum zero.

The scores ranged from 0 to 20. They were re-distributed over six categories. See Table 4.6

TABLE 4.6

DISTRIBUTION OF EXTRAVERSION SCORES

SCORES	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED	TOTAL	PERCENT (TOTAL)
0 - 3	1	0	1	1	2	1,493
4 - 7	0	4	4	4	8	5,970
8 - 11	9	14	23	13	36	28,866
12 - 15	11	23	34	13	47	35,075
16 - 19	12	13	25	10	35	26,119
20 - 23	2	3	5	1	6	4,478
N	35	57	92	42	134	
$\overline{X}$	13,771	13,316	13,489	12,619	13,216	
s	3,883	3,676	3,763	4,336	3,973	

The minor skews to the left among the Diploma students suggest that Diploma students are slightly more extraverted than B.Paed students. This inference is confirmed by the mean scores in which the Diploma mean of 13,49 was higher than the B.Paed mean of 12,62. This difference was not significant at the 5% level ($F = 1,38$). The analysis of variance test on the difference between the JS and SP means proved not to be significant at the 5% level ($F < 1$). This was also the case with B.Paed and SP ($F = 1,44$).

It would seem that extraversion scores of our students differ little from those obtained in other parts of the world:

13,1 in the United States (Eysenck and Eysenck, 1968)

12,6 for Black students in Mississippi (Lowe and Hildman, 1972) and

12,25 for Iranian students (Mehryar, 1970).

4.2.5 Neuroticism

The maximum score for Neuroticism on the Eysenck Personality Inventory Form A is 24 and the minimum 0.

Scores ranged from 1 to 22 and were split into six categories as shown in Table 4.7

TABLE 4.7

DISTRIBUTION OF NEUROTICISM SCORES

SCORES	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B.PAED	TOTAL	PERCENT (TOTAL)
0 - 3	4	3	7	4	11	8,209
4 - 7	7	8	15	4	19	14,179
8 - 11	7	19	26	14	40	29,851
12 - 15	10	16	26	11	37	27,612
16 - 19	5	9	14	9	23	17,164
20 - 23	2	2	4	0	4	2,985
N	35	57	92	42	134	
$\overline{X}$	11,029	11,263	11,174	11,119	11,157	
s	5,377	4,598	4,911	4,690	4,844	

Neuroticism means were about the same for all groups. The differences between the means were not significant at the 5% level ($F < 1$).

The mean neuroticism score for the Total of 11,16 compares favourably with Eysenck's United States mean of 10,9 (Eysenck and Eysenck, 1968), Mehryar's Persian mean of 10,97 (Mehryar, 1970) Behr's University of Durban-Westville mean of 10,97 (Behr, 1974, 15). It is slightly higher than Eysencks' British mean of 10,01 (Eysenck and Eysenck, 1970).

4.2.6 Interests

Eight subscores were obtained for each student in the eight areas of interest measured by the Occupational Interest Guide. Each subscore had a maximum of 28 and a minimum of 0.

The eight areas of interest were: Scientific, Social Service, Clerical/Sales, Literary, Artistic, Computational, Practical and Outdoor.

To help the writer to analyse these scores, the assistance of colleagues was sought. Faculty of Education lecturers were asked to rank the eight interests in the Guide in order of the importance they attached to these as desirable qualities in prospective teachers. The responses of 30 faculty members were analysed statistically (See Appendix B). The total rank scores and rank positions obtained are shown in Table 4.8 below.

TABLE 4.8

INTEREST RANKS

INTERESTS	TOTAL RANK SCORE	RANK POSITION
Social Service	2,32	1
Literary	2,61	2
Scientific	2,77	3
Practical	4,32	4
Artistic	4,45	5
Computational	5,03	6
Outdoor	6,52	7
Clerical/Sales	7,13	8

According to lecturers, social service was the most important interest

desired in an aspirant teacher, with literary and scientific interests also of considerable importance; while the others were not as strongly supported as the three mentioned above (See Total Rank Scores in Table 4.8).

An analysis of students' scores was made in respect of these three major areas of interest. See Table 4.9

TABLE 4.9

DISTRIBUTIONS IN RESPECT OF THE THREE MAJOR INTEREST AREAS

	SP	JS	DIP.	B.PAED	TOTAL
(A) Students with highest scores in Social Service :	16	25	41	13	54
Percentage :	45,7	43,9	44,6	31,0	40,03
(B) Students whose two highest scores were in Social Service and Literary or Social Service and Scientific:	12	22	34	8	42
Percentage :	34,3	39,0	37,0	19,0	31,3

Table 4.9 shows that in respect of Social Service 44,6% of the Diploma students revealed that this particular interest was their strongest; while for B.Paed the precentage was 31. Between the two groups, the difference in proportions between those prominent in Social Service and those not, was not significant at the 5% level (chi square = 2,22).

Table 4.9 attempts to identify students who are not only strong in the Social Service attribute but who also possess the academically – directed Scientific or Literary interests. While 37% of the Diploma group displayed these qualities only 19% of the B.Paed did. The difference in proportions was significant at the 5% level. (chi square = 4,30).

If the lecturers' rankings constitute a criterion then the B.Paed are not as interested in teaching as the Diploma and appear less suitable than the Diploma.

4.2.7 Commuter Time

The time taken for a single journey from his place of residence to the University was given by the student in the inventory. In order to enable the present writer to check on the accuracy of the time given by the student, details about the nature of travel and the address of the place of residence were also required of the student.

The time is given in minutes.

Hostel students were given 0 minutes for this variable. Fifteen students lived in the hostel. The majority, numbering 118, travelled daily to the University.

The times given by the students ranged from 0 minutes to 100 minutes. This range was subdivided into 6 categories as illustrated in Table 4.10

The distributions showed a moderate skew to the right indicating that a greater proportion of the students fell into the lower time categories i.e. they lived closer to the University.

Twenty-nine students (21,64%) lived within twenty minutes travelling time fr University, 63 students (47,02%) within forty minutes travelling time, 100

students (74,63%) within sixty minutes and 34 students (25,37%)over sixty minutes. The mean travelling time for the whole group was 39,813 minutes. The mean times for the different groups were basically the same.

TABLE 4.10

DISTRIBUTION OF COMMUTER TIME

SCORES	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED	TOTAL	PERCENT (TOTAL)
0 - 19	8	9	17	12	29	21,642
20 - 39	9	16	25	9	34	25,373
40 - 59	10	16	26	11	37	27,612
60 - 79	2	10	12	2	14	10,448
80 - 99	5	5	10	5	15	11,194
100 - 199	1	1	2	3	5	3,731
N	35	57	92	42	134	
$\bar{X}$	38,714	41,404	40,380	38,571	39,813	
s	26,059	24,866	25,360	29,452	26,714	

4.2.8 Father's Education

A seven-level code (See Table 4.11) was used to quantify the father's education. The levels which ranged from no Western education to universi graduate education, are shown below.

TABLE 4.11

SEVEN-LEVEL CODE FOR FATHER'S EDUCATION

CODE	LEVEL OF EDUCATION
0	No Western Education
1	Junior Primary Education
2	Senior Primary Education
3	Junior Secondary Education
4	Senior Secondary Education
5	University Undergraduate/Postmatric College
6	University Graduate

Scores ranged from 0 to 6. Frequency distributions were drawn over seven levels. See Table 4.12

TABLE 4.12

DISTRIBUTION OF LEVELS OF FATHER'S EDUCATION

SCORES	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B.PAED	TOTAL	PERCENT (TOTAL)
0	1	1	2	1	3	2,239
1	1	5	6	7	13	9,701
2	7	19	26	11	37	27,612
3	10	20	30	10	40	29,851
4	10	8	18	4	22	16,418
5	3	4	7	6	13	9,701
6	3	0	3	3	6	4,478
N	35	57	92	42	134	
$\overline{X}$	3,371	2,719	2,967	2,929	2,955	
s	1,354	1,029	1,238	1,564	1,349	

The data revealed that three fathers had no Western education and six were university graduates. Fifty fathers (37%) had junior secondary education only, twenty-two (16%) senior secondary education only and thirteen (10%) had post-matric undergraduate level of education.

Only the SP distribution showed a slight skew to the left, indicating that a small majority of the SP fathers were at the higher educational levels.

The above observation was confirmed by the SP mean level of 3,37 which was the highest among the different groups. The JS mean of 2,72 was the lowest. Analysis of variance tests proved the difference in the means between these

two groups to be significant at the 1% level (F = 14,31). The difference between the means of the B.Paed and SP was not significant at the 5% level (F = 1,68).

The educational levels of fathers are markedly lower than those of their offspring. The fact that the better-educated fathers chose the SP course for their sons and daughters might indicate greater pragmatism or a clearer grasp of the potential of their offspring.

It is encouraging to note the progessive rise in the educational levels of fathers over the past decade. Behr and Behr (1965) reported 12% of fathers with no Western education, Behr (1972) 9% and in the present study the figure is 2,24%.

4.2.9 Mother's Education

The same code levels used for father's education (Table 4.11) were employed to measure the educational levels of the mothers.

The scores ranged from 0 to 5. Frequency distributions were calculated over six intervals. See Table 4.13

The distributions showed a moderate departure from the normal. All showed moderate skews to the right implying that most mothers belonged to the lower educational levels.

The data revealed that 17,16% (23) of the mothers had no Western education, 67,2% (90) had senior primary education or less, 8 mothers (0,60%) had senior secondary education, while only 2 had done post-matric work. There were no graduates. Over the past decade the education of the Indian mother has improved. This is evident if the present figure of 17,16% is compared with the previous percentages of mothers with no Western education: 43% reported Behr and Behr (1966, 34) and 38% by Behr (1972,4).

TABLE 4.13

DISTRIBUTION OF LEVELS OF MOTHER'S EDUCATION

SCORE	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B.PAED	TOTAL	PERCENT (TOTAL)
0	4	12	16	7	23	17,164
1	4	11	15	9	24	17,910
2	10	17	27	16	43	32,090
3	14	11	25	9	34	25,373
4	2	5	7	1	8	5,970
5	1	1	2	0	2	1,493
N	35	57	92	42	134	
$\overline{X}$	2,257	1,807	1,978	1,714	1,895	
s	1,179	1,304	1,277	1,055	1,217	

The mean educational level of 1,895 for the mother did not compare favourably with the father's education mean of 2,955. Indian fathers are better educated than Indian mothers. The generally low levels of Western education amongst his parents constitute a handicap of some magnitude to the Indian student in his pursuit of a Western education (Herrenkohl, 1972, 325). The fact that the mother is at an appreciably lower level than the father, aggravates the situation further (Brown, 1962, 548).

Diploma students had slightly better-educated mothers than B.Paed as the respective means of 1,978 and 1,714 indicate. This difference was not significant at the 5% level ($F = 1,36$).

The SP mean of 2,257 was highest while the B.Paed mean of 1,714 was the lowest. The difference between the SP and B.Paed means was significant at

the 5% level (F = 4,43). Like the SP fathers, the SP mothers are the best educated group in this study.

4.2.10 Parent's Education

It was decided to study parents' education to see if it threw additional light on findings already made on the father's and mother's education.

To yield a measure of parent's education the levels of both parents were summed (Guilford, 1964, 462; Goodenough, 1960, 381). The scores ranged fro 0 to 10 and were distributed over six levels as shown in Table 4.14

TABLE 4.14

DISTRIBUTION OF LEVELS OF PARENT'S EDUCATION

SCORE	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED	TOTAL	PERCENT (TOTAL)
0 - 1	2	3	5	5	10	7,463
2 - 3	5	17	22	6	28	20,896
4 - 5	8	18	26	16	42	31,343
6 - 7	13	13	26	10	36	26,866
8 - 9	7	6	13	4	17	12,687
10 - 11	0	0	0	1	1	0,746
N	35	57	92	42	134	
$\overline{X}$	5,629	4,526	4,946	4,643	4,851	
s	2,256	2,145	2,252	2,328	2,281	

As expected, the SP mean of 5,63 was the highest. The SP mean was significantly different from the JS mean of 4,53 (F = 5,4) at the 5% level. The SP mean was higher than the B.Paed mean of 4,64 but the difference misses

significance at 5% (F = 3,47). The JS have the lowest mean for parents' education; yet they have the highest scholastic aptitude mean.

It would appear from this sample of students that those with the highest scholastic aptitude scores come from homes where parents have the lowest education. This is an interesting revelation and will be pursued further in Chapter Six.

4.2.11 Father's Occupation

To measure occupational levels, the status classification of the Institute for Social Research of the University of Natal was used. The Institute had modified the 1954 classification of Glass (1954) of Great Britain, for use in South Africa. The seven-level classification is shown in Table 4.15

TABLE 4.15

SEVEN- LEVEL CODE FOR FATHER'S OCCUPATION

CODE	LEVEL OF OCCUPATION
1	Manual Unskilled
2	Manual Semi-skilled/operational
3	Routine Grades of non-manual and skilled-manual
4	Inspectoral, supervisory and other non-manual (Lower Grade)
5	Inspectoral, supervisory and other non-manual (Higher Grade)
6	Managerial and Executive (with some responsibility for directing and initiating policy)
7	Professionally qualified and High Administrative

The range covered all levels. See Table 4.16

TABLE 4.16

DISTRIBUTION OF OCCUPATIONAL LEVELS OF FATHERS

SCORES	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B.PAED	TOTAL	PERCENT (TOTAL)
1	2	4	6	3	9	6,716
2	3	12	15	13	28	20,896
3	13	15	28	9	37	27,612
4	7	13	20	4	24	17,910
5	6	11	17	2	19	14,179
6	3	2	5	5	10	7,463
7	1	0	1	6	7	5,224
N	35	57	92	42	134	
$\bar{X}$	3,714	3,368	3,511	3,667	3,560	
s	1,385	1,293	1,347	1,947	1,558	

A minor skew to the right was observed for all groups. This implies that most fathers were in the lower occupational levels. Seventy-two fathers (52,2%) were in the three lowest levels comprising manual unskilled, semi-skilled, routine manual and skilled manual. Only eleven fathers (8,2%) were in managerial or highly administrative or professional posts.

The mean occupational level of the Diploma of 3,511 was less than the B.Paed mean of 3,667. The difference was not significant at the 5% level ($F < 1$). Here again, the SP mean of 3,714 was the highest and that of JS (3,368) the lowest.

4.2.12 Mother's Occupation

The classification of occupations used to measure the father's level (Table 4.15) was also used to measure the mothers'. Mothers who were full-time housewives and who as a result were not in employment, were put down at level 0.

The six mothers' occupational levels ranged from 0 to 5. See Table 4.17

TABLE 4.17

DISTRIBUTION OF OCCUPATIONAL LEVELS OF MOTHERS

SCORES	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B.PAED	TOTAL	PERCENT (TOTAL)
0	33	51	84	39	123	91,791
1	0	0	0	0	0	0
2	1	1	2	2	4	2,985
3	1	2	3	1	4	2,985
4	0	2	2	0	2	1,493
5	0	1	1	0	1	0,746
N	35	57	92	42	134	

The distributions were not normal. One hundred and twenty-three mothers (91,79%) were full-time house-wives. Only 11 mothers (8,2%) worked, of whom eight were in manual or semi-skilled occupations.

Although 82,9% of the mothers had a Western education, 91,79% did not go out to work. However, of the sample under investigation 50% were females. So it might be expected that these students, on qualifying, would continue to work, thus changing the present occupational patterns of Indian mothers.

4.2.13 Part-Time Commitments

Multiple choice categorical items were used in the Inventory to measure part-time commitment. Two items were used, one for part-time work for remuneration and one for work without remuneration. Rating scales were employed to obtain a measure for part-time commitment.

Ratings were made according to the following table

TABLE 4.18

SCALE FOR MEASURING PART-TIME COMMITMENTS

DAYS/WEEK	POINTS
0 day per week	5
1 day per week	4
2 days per week (Fri & Sat)	3
2 to 3 weekdays	2
1 week	1

Scores ranged from 1 to 5. These were arranged into frequency distribution over 5 levels. See Table 4.19

TABLE 4.19

DISTRIBUTION OF PART-TIME COMMITMENTS SCORES

SCORE	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED	TOTAL	PERCENT (TOTAL)
1	1	0	1	0	1	0,746
2	4	0	4	1	5	3,731
3	4	10	14	6	20	14,925
4	7	11	18	7	25	18,657
5	19	36	55	28	83	61,940
N	35	57	92	42	134	
$\bar{X}$	4,114	4,456	4,326	4,476	4,373	
s	1,165	1,774	0,960	0,823	0,920	

The distributions were all skewed to the left, suggesting that a majority of students had little or no part-time commitment.

Part-time mean scores for the different groups did not vary much. The B. Pa mean of 4,476 was highest while SP had the lowest mean of 4,114.

The analysis of variance test reveals that the difference between the means of SP and JS misses significance at the 5% level (F = 3,45). The F value of 1,141 for B.Paed - Dip is also not significant at 5%.

4.2.14 Age

The student's age was obtained from the Biographical and Sociological Inventory. The ages ranged from 17 to 23. These were distributed over 7 levels. See Table 4.20

TABLE 4.20

DISTRIBUTION OF AGES OF STUDENTS

SCORES	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B.PAED	TOTAL	PERCENT (TOTAL)
17	0	0	0	1	1	0,746
18	7	7	14	4	18	13,432
19	7	23	30	17	47	35,074
20	10	13	23	8	31	23,134
21	9	12	21	6	27	20,149
22	1	1	2	4	6	4,478
23	1	1	2	2	4	2,985
N	35	57	92	42	134	
$\bar{X}$	19,80	19,667	19,722	19,812	19,746	
s	1,260	1,098	1,167	1,384	1,184	

Except for eleven students, the rest fell into the age range 18 to 21.

Nineteen-year olds constituted the biggest group - 35,07%. This is the age group that Brandford (1961, 272) found to perform worse than 18 and 20 year olds among first-year Indian medical students at Natal University.

There was no significant difference between the mean ages of the various subgroups ($F < 1$).

4.2.15 Sex

The sex of the student was given in the Inventory.

There were 67 males and 67 females in the Total. Even among the subgroups the sexes were equal or almost equal as Table 4.21 indicates

TABLE 4.21

DISTRIBUTION OF STUDENTS ACCORDING TO SEX

SCORES	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED	TOTAL	PERCENT (TOTAL)
Male	17	29	46	21	67	50
Female	18	28	46	21	67	50
N	35	57	92	42	134	

The ratio of 1 : 1 does not apply to the entire University where the ratio of men to women is 2,4 : 1. At the University of Durban-Westville mor women enter the Faculties of Arts and Education than the Faculties of Science and Commerce (Nel, 1976).

At the Springfield College of Education which is the largest Indian teacher training institution in South Africa, women now out-number the men and are gaining steadily on them. It is pertinent to note that the ratio of males tc females in the Indian high schools in South Africa in 1975 was 1,32 : 1 (Pillay and Naguran, 1976).

The trend is the same overseas but more pronounced. In 1965 the student intake of the 10 colleges of Education of the Cambridge Institute of Education was 154 and the ratio of males to females was 1 : 10,7 (McLeish, 1970, 57).

The mean academic performances of males and females for the different groups were computed.

In the Diploma group the male mean of 4,19 was slightly greater than the female mean of 3,90. The position, however, was reversed for the B.Paed with the female mean of 3,07 greater than the male mean of 2,93. The differences however, were not significant at the 5% level.

4.2.16 Financial Aid

Students had to indicate in the Inventory whether they were recipients of bursaries or not. The amount of each bursary is R500 per annum. The distributions of bursars and non-bursars appear in Table 4.22

TABLE 4.22

DISTRIBUTION OF BURSARS AND NON-BURSARS

SCORE	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B.PAED	TOTAL	PERCENT (TOTAL)
Bursars	20	19	39	29	68	50,746
Non-Bursars	15	38	53	13	66	49,254
N	35	57	92	42	134	

Of the 134 students, 68 students held bursaries. Bursaries were distributed as follows: B.Paed, 29 students (69,05%); SP, 20 students (57,14%); JS, 19 students (33,33%).

As expected, the better matriculants were the B.Paed and they held the highest

percentage of bursaries. Bursaries are awarded on the basis of

(i) academic ability and

(ii) choice of subjects

in which teachers are scarce. One reason for the SP having much greater percentage-wise representation among the bursars than the slightly better qualified JS, was that many JS students did not accept the advice of the admission selection officers in their selection of courses and subjects. By selecting their own, often not compatible with their proven abilities and the need of the Education department, they made themselves ineligible for bursary awards.

There were other students among the JS who did not want to be tied to a four-year teaching contract after qualifying, by accepting the bursary. They wanted to be free to change their career programme at short notice. Many other students still hoped to satisfy exemption requirements for the matriculation examination and took a Diploma course as an interim measure.

The academic performances of the bursars and non-bursars in their first year at the University were compared. (See Table 4.23)

TABLE 4.23

MEAN ACADEMIC PERFORMANCE SCORES OF BURSARS AND NON-BURSARS

	SP	B.PAED	DIP	JS	TOTAL
Bursars' Mean Score	3,95	2,88	2,88	4,08	3,51
Non-Bursars' Mean Score	4,24	3,27	3,98	3,85	3,92

With the exception of the JS all other groups revealed the same pattern: the

non-bursars had done better than the bursars. The difference between the means for the Total was significant at the 5% level. This is surprising as the bursars were regarded as better students according to matriculation results.

The reason probably lies in what the British call the "backwash effect of over-specialisation" i.e. intensive coaching and tuition for the matriculat which creates problems at university because such preparation is ill-advised for university.

The above findings support those of Knight (1968) and Winder (1972). The JS have proved an exception. The JS bursars, who accepted the advice of the admission/selections officers, handled their examination more effectively than the JS non-bursars — many of whom chose subjects considered unsuitable by student counsellors. The importance of counselling and guidance for first-year students is clearly evident.

4.2.17 Residence

Students had to indicate in the Inventory whether they lived at home, in private lodgings or in the University residence.

Only 16 students (11,94%) lived in the University residences. See Table 4.24

TABLE 4.24

DISTRIBUTION OF HOSTEL AND NON-HOSTEL RESIDENTS

SCORES	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B.PAED	TOTAL	PERCENT (TOTAL)
Hostel	4	4	8	8	16	11,940
Non-Hostel	31	53	84	34	118	88,060
N	35	57	92	42	134	

This small number necessitated that comparision with non-residents should be made with considerable caution.

Calculations revealed that hostel students had a mean academic performance score of 3,70 and the non-residents 3,71. This result endorses the conclusion of Miller (1970) that the superiority of neither group is suggested.

A breakdown of the figure for non-residents revealed that of the 118 non-residents, only 12 lived in private lodgings. A large majority, i.e. 106 students (79%), lived at home. The performances of these two groups were computed. The mean academic performance score of the lodgers was 3,65 and that of the home-based students was 3,72.

4.3 THE USE OF LIKERT-TYPE, CATEGORICAL MULTI-CHOICE AND CHECKLIST ITEMS FOR MEASURING DIMENSIONS WHICH DO NOT HAVE CORRESPONDING PHYSICAL MEASURES

A major problem in social experimentation today is in the area of measurement where it is difficult to evaluate a device for measuring something that is intangible (Sidowski, 1960, 639). The remaining factors in this study are career aspiration, home regime and study facilities. The measurement of these factors involves dimensions for which there are no corresponding physical measures (Keats, 1971, 69). This problem first confronted psychologists who wanted to measure attitudes. Scales to measure attitudes were produced by Thurstone in 1929 and 1931; Likert in 1932 and Guttman in 1944 and 1947 (Sidowski, 1966, 613).

Guttman's scale has been the subject of much criticism (Guilford, 1954, 460). Likert's and Thurstone's scales are frequently used. Likert's technique is simpler than Thurstone's and is regarded by many as being at least as reliable (Guilford, 1954, 460; Freeman, 1960, 486).

There are objections to the use of these scales on the grounds of doubtful reliability and validity (Keats, 1971, 80). Validity has not yet been clearly established and only internal validity can be obtained for rating scales (Freeman, 1960, 465; Sidowski, 1966, 615). Reliability coefficients ranging from 0,78 to 0,92 have been reported for Likert's scales (Sidowski, 1966, 615). These values are regarded as satisfactory for most purposes for which the scales are likely to be used (Goodenough, 1960, 381).

Despite the objections, Likert's method or some variation of it, is widely used; and for many purposes it is the only practical method (Keats, 1971, 7 Although the greatest popularity of these scales is in applied psychology, they are also used widely in many types of basic research (Guilford, 1954, 2 Techniques of attitude construction have been applied to social, educational and other research (Vernon, 1965, 146). Rating-scale procedures exceed all others in popularity and use (Guilford, 1954, 263). Numerical scales are among the easiest to construct and apply and the simplest in terms of handling results (Guilford, 1954, 265).

Likert proposed that the subjects be asked to express the extent of their agreement with items instead of merely indicating agreement or disagreement in an "all or none" fashion (Goodenough, 1960, 380). Finer grades of responses are permitted by extending the alternatives to "strongly agree", "agree", "undecided", "disagree", "strongly disagree". Arbitrary weights 1 to 5 are assigned to these ratings in such a manner that either strong agreement with the statement or strong disagreement is given a weight of 5 while the response at the opposite extreme is assigned weight 1. The intermediate responses assume weights ranging from 4 to 2 (Goodenough, 1960, 319; Guilford, 1954, 459; Keats, 1971, 70; Vernon, 1965, 148). A common question in constructing rating scales concerns the number of rating steps i.e. alternatives. In a survey of 54 teacher-rating scales it was

found that some had as few as 2 steps while others had as many as 7 (Guilford, 1954, 289). We are left with no hard and fast rules concerning the number of scale ratings to be used (Guilford, 1954, 291).

In the measurement of the remaining factors i.e. career aspirations, home regime and study facilities, Likert-type items, categorical multi-choice items and check-list items (2 point scale) were used. Each is discussed in turn.

4.4 ANALYSIS AND INTERPRETATION OF REMAINING FACTORS

4.4.1 Study Facilities

To obtain a measure for study facilities, 2 Likert-type items with 5 alternatives each, 1 categorical multi-choice item with 5 alternative 3 categorical multi-choice items with 3 alternatives each and 2 check list items with 2 alternatives each, were employed. Scale values were used as weights for the responses (Guilford, 1954, 459; Goodenough, 1960, 380; Vernon, 1965, 148). (See Appendix A for items)

The score of an individual was the sum of his ratings on all items (Guilford, 1954, 462; Goodenough, 1960, 380; Sidowski, 1966, 613).

The scores ranged from 8,50 to 18. This range was subdivided into 7 categories. See Table 4.25

One has to be cautious about the inferences one makes from the analysis, for reasons mentioned in Section 4.3

The SP had the highest mean scores of 14,16. This is not unexpected when it is recalled that the parents of this group had the highest educational and occupational mean scores. However, the mean scores of the other groups were not much lower than those of the SP. The differences between the means of the various groups were not significant at the 5% level ($F < 1$).

TABLE 4.25

DISTRIBUTION OF SCORES FOR STUDY FACILITIES

SCORES	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED	TOTAL	PERCENT (TOTAL)
6 - 7,99	0	1	1	0	1	0,746
8 - 9,99	0	1	1	4	5	3,731
10 - 11,99	4	8	12	6	18	13,433
12 - 13,99	10	22	32	13	45	33,582
14 - 15,99	14	14	28	6	34	25,373
16 - 17,99	3	4	7	5	12	8,955
18 - 19,99	4	7	11	8	19	14,179
N	35	57	92	42	134	
$\overline{X}$	14,157	13,761	13,911	14,089	13,967	
s	2,080	2,497	2,355	2,807	2,493	

4.4.2 Home Regime

To obtain a measure for home regime, 4 items were used. One was a Likert-type with 4 alternatives, one a categorical multi-choice with 3 alternatives, 2 check-list items with 2 alternatives. Scale values were used as weights for the responses (Guilford, 1954, 459; Goodenough, 1960, 380; Vernon, 1965, 148). (See Appendix A for the items).

The score for each individual was the sum of the ratings on all the items (Guilford, 1954, 426; Goodenough, 1960, 380; Sidowski, 1966, 613). The scores ranged from 3 to 9. These scores were arranged into 7 categories — See Table 4.26

TABLE 4.26

DISTRIBUTION OF SCORES FOR HOME REGIME

SCORES	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED	TOTAL	PERCENT (TOTAL)
3	1	0	1	0	1	0,746
4	2	2	4	0	4	2,985
5	2	2	4	1	5	3,731
6	4	5	9	4	13	9,701
7	12	27	39	24	63	47,015
8	11	19	30	12	42	31,343
9	3	2	5	1	6	4,478
N	35	57	92	42	134	
$\overline{X}$	6,971	7,140	7,076	7,190	7,112	
s	1,404	0,999	1,172	0,732	1,056	

Again, because of the nature of the instruments used, inferences must be made with some caution (Freeman, 1960, 465; Goodenough, 1960, 381; Vernon, 1965, 62; Sidowski, 1966, 615).

The distributions had pronounced skews to the left, indicating more high scores than low scores for home regime. This suggests that the power distribution at home was inclined to be democratic with the student having some say in decisions involving himself. With the father or patriach at the head of the family and the mother usually a full-time housewife, sound family relationships are expected.

The mean scores of the various groups are about the same, suggesting that home regime characteristics do not vary much for the sample in this study.

Analysis of variance tests of the differences between the means of various groups proved not be significant at the 5% level ($F < 1$).

4.4.3 Teacher-Career Aspirations

Four items were used to obtain a measure for teacher-career aspirations.

Two were Likert-type items with four alternatives each, one a categorical multi-choice item with 3 alternatives and one a two-response check-list type.

Again, scale values were used as weights for the responses (Guilford, 1954, 459; Goodenough, 1960, 380; Vernon, 1965, 148).

The score of each individual was the sum of his ratings on all items (Guilford, 1954, 462; Goodenough, 1960, 380; Sidowski, 1966, 613).

Scores ranged from 3 to 11. They were distributed over 5 categories. See Table 4.27

TABLE 4.27

DISTRIBUTION OF SCORES FOR TEACHER-CAREER ASPIRATIONS

SCORES	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED	TOTAL	PERCENT (TOTAL)
3 - 4	0	2	2	0	2	1,493
5 - 6	2	2	4	6	10	7,463
7 - 8	17	26	43	19	62	46,269
9 - 10	12	25	37	14	51	38,060
11 - 12	4	2	6	3	9	6,716
N	35	57	92	42	134	
$\bar{X}$	8,60	8,35	8,45	8,10	8,34	
s	1,34	1,17	1,49	1,63	1,52	

Again, inferences must be made with some caution because of the limited validity and reliability of the instruments and also because of possible bias in student responses (Freeman, 1960, 465; Goodenough, 1960, 381; Vernon, 1965, 62; Sidowski, 1966, 615).

Slight skews to the left suggest that students' aspirations lie more among the higher levels of teacher-career aspirations than among the lower levels The mean score of 8,336 for the Total confirms that the aspiration levels are generally high.

The B.Paed mean of 8,10 is less than the Diploma mean of 8,45. However the difference between the means is not significant at the 5% level ($F = 1,48$).

The B.Paed mean of 8,10 is, however, significantly lower than the SP mean of 8,60 ($F = 4,20$). This implies that there is a significant difference between the teacher-career aspirations levels of B.Paed and the SP. This difference in aspiration levels is a likely contributor to the differences in academic performance levels between these two groups in the University examination where the B.Paed performance is inferior to that of the SP.

CHAPTER FIVE

5. CORRELATIONAL ANALYSIS AND INTERPRETATION

5.1 VARIABLES SELECTED FOR ANALYSIS

Nineteen variables were considered for the correlational analysis that is described in this Chapter. They are:-

Academic Performance at University	(1)
Scholastic Aptitude	(2)
High-School Achievement	(3)
Extraversion	(4)
Neuroticism	(5)
Teacher-Oriented Interests	(6)
Commuter Time	(7)
Father's Education	(8)
Mother's Education	(9)
Parent's Education	(10)
Father's Occupation	(11)
Study Facilities	(12)
Home Regime	(13)
Part-Time Commitments	(14)
Age	(15)
Sex	(16)
Financial Aid	(17)
Residence	(18)
Teacher-Career Aspirations	(19)

These numbers 1 to 19 will always be associated with the variables against

which they appear throughout the discussions in this chapter.

5.2 STATISTICAL PROCEDURES

The major statistical procedure selected for the study was that of correlational analysis. This is a basic method used to measure the relationship between academic performance and the factors affecting it (Cattell and Butcher, 1968, 217; Sumner, 1974, 53). It involves gross, partial and multiple correlation (Lavin, 1965, 65). In the present investigation the coefficient of determination was also included.

These statistics are explained below.

5.2.1 Gross Correlation (r)

Each variable was contrasted with every other variable by means of product-moment correlation coefficients to provide a description of the relationships between the variables.

Correlation is basically a measure of relationship between two variables (Downie and Heath, 1970, 86). Pearson and Bennett (1942, 143) define the correlation coefficient as an attempt to summarise in one number the amount of relationship existing between two variables. Of the various correlation coefficients available the one most widely employed is the Pearson product-moment correlation coefficient.

The requirements for its use are: measurements of variables are continuous; the relationships between variables are linear (Nuttall and Willmot, 1972, 148

The formula for the Pearson r is :-

$$r = \frac{N\Sigma XY - \Sigma X\Sigma Y}{\sqrt{\left[N\Sigma X^2 - (\Sigma X)^2\right]\left[N\Sigma Y^2 - (\Sigma Y)^2\right]}}$$

(Spiegel, 1972, 245)

The Pearson product-moment correlation coefficient (Pearson r) was used to measure the relationship between the criterion (academic performance) and the following continuous variables: scholastic aptitude, high-school achievement, extraversion, neuroticism, father's education, mother's education, parent's education, father's occupation, study facilities, home regime, part-time commitments, age and career aspirations.

Because Pearson r cannot be applied to dichotomous variables, the phi coefficient, which is also a product-moment correlation coefficient (Edwards, 1969), was selected for the dichotomous variables: sex (male, female), residence (residents, non-residents) and financial aid (bursars, non-bursars).

The phi-coefficient (Ø) is one of the special four used in cases where one or both variables are dichotomous (Nuttall and Willmot, 1972, 149). Phi coefficients can be used with continuous variables which have been grouped into two categories (Garret and Woodworth, 1964, 125). Where the dichotomous variables were correlated with the continuous variables, the mean (a statistic already calculated for each continuous variable by the computer) was used to dichotomise the continuous variables before the Ø coefficient was applied. The dichotomy obtained was: below average, average and above average.

The formula for the phi coefficient is :-

$$\emptyset = \frac{ad - bc}{\sqrt{klmn}}$$

(Downie and Heath, 1970, 113)

The various letters in the Ø formula represent frequencies (See Appendix B4 for an explanation of the formula for Ø).

5.2.2 Partial Correlation Coefficients (Partial r)

Partial and multiple correlation represent an important extension of the theory and techniques of simple or two-variable linear correlation to problems which involve three or more variables (Garrett and Woodworth, 1964, 403). It frequently happens that the relationship between two variables is influenced by one or more other variables. Partial r is the measure of the effect of one factor on the dependent factor when the effects of all other factors are controlled (Pearson and Bennett, 1942, 185; Lavin, 1965, 25). Partial r enables us to measure the relationship between two variables while "partialing out the effects of other variables (Downie and Heath, 1970, 120). The problem of holding certain variables constant while the correlation coefficien between others is measured, occurs often in research.

The general formula for partial r is :-

$$r_{1\,2\,.\,3\,4\,5\,\ldots\,n} = \frac{(r_{12.34\ldots\,\overline{n-1}}) - (r_{1n.\,34\ldots\overline{n-1}})(r_{2n.34\ldots\overline{n-1}})}{\sqrt{(1-r^2_{1n.\,34\ldots\overline{n-1}})\quad(1-r^2_{2n.\,34\ldots\overline{n-1}})}}$$

(Garrett and Woodworth, 1964, 411)

(See Appendix B5 for an explanation of the above formula).

5.2.3 Multiple Correlation Coefficients (R)

Correlation (gross) measures the degree and nature of the effect of one variable on another. While it is useful to know how one phenomenon is influenced by another, it is also important to know how this phenomenon is affected by several other variables. The multiple correlation coefficient (R) measures the degree of relationship between one variable and a combination of two or more other variables, (Downie and Heath, 1970, 121; Pearson and Bennett 1942, 185). Multiple correlational analysis, therefore, studies the effect of two or more independent variables on the dependent variable.

The formula for R is

$$R_{1.23...n} = \sqrt{1 - (1-r_{12}^2)\ (1-r_{13.2}^2)\ (1-r_{14.23}^2).....(1-r_{1n.23...n-1}^2)}$$

(Steel and Torrie, 1960, 286)

See Appendix B6 for explanation of formula.

While gross r and partial r range from -1 to +1, multiple R ranges from 0 to 1 (Pearson and Bennett, 1942, 196).

5.2.4 Coefficients of Determination

The coefficient of determination is obtained by taking the square of the correlation coefficient.

5.2.4.1 Coefficient of Determination - Gross r

If r_{12} measures the correlation between dependent variable 1 and independer variable 2 then the coefficient of determination r_{12}^2 measures the proportic of total variation in 1 accounted for by 2; e.g. if $r_{12} = 0,60$ then $r_{12}^2 = 0,36$. This means that independent variable 2 measures 0,36 (36%) o the amount of variability in 1. Thus the measure of variability in 1 not explained by 2 is 1 - 0,36 = 0,64 (64%) (Garrett and Woodworth, 1964, 180).

5.2.4.2 Coefficient of Determination - Multiple R

$R_{1.234}$, for example, measures the degree of association between dependent variable 1 and the three independent variables 2,3 and 4. $R_{1.234}^2$ is the coefficient of multiple determination and it measures the proportion of variability in 1 explained by 2,3 and 4. For example, if $R_{1.234} = 0,846$ then $R_{1.234}^2 = 0,846^2 = 0,715$ (71,5%). This means that 2,3 and 4 determine 71,5% of the variability in 1. Further, if $R_{1.23}^2 = 0,62$ (62%) and $R_{1.234}^2 = 0,73$ (73%) then the inclusion of 4 increases the percentage determination by $R_{1.234}^2 - R_{1.23}^2 = 0,73 - 0,62 = 0,11$ (11%) (Pearson and Bennett, 1942, 186).

5.2.5 Significance of Correlation Coefficients

After a correlation coefficient is computed the question that follows is whether the correlation is significant or not. That is, does the correlatio coefficient represent a real raltionship between the variables, or is it brought about by chance?

5.2.5.1 Significance of Gross Correlation Coefficients

Previously the significance test for product-moment correlation coefficients was the z test or t test or an analysis of variance test (Pearson and Bennett, 1942, 405). The test selected has to be repeated for each r calculated. This is no longer necessary as a table has been developed by Snedecor (1946) giving the statistical significance of r and R for the 5% and 1% levels, for degrees of freedom ranging from 1 to 1 000 (Steel and Torrie, 1960, 453).

Since the phi coefficient (Ø) is a product-moment correlation coefficient it can be checked for significance directly from the table for r (Garrett and Woodworth, 1964, 389). To test the significance of the phi coefficient (Ø), chi square (χ^2) can also be used (Garrett and Woodworth, 1964, 391; Downie and Heath, 1970, 236).

5.2.5.2 Significance of Partial Correlation Coefficients

Partial r coefficients may also be tested for significance by any one of the three ways for testing gross r (Pearson and Bennett, 1942, 408). However, Snedecor has developed a table from which the significance of partial r can be estimated without calculation (Pearson and Bennett, 1942, 412).

5.2.5.3 Significance of Multiple Correlation Coefficients

Snedecor again has provided tables from which the significance of R could be ascertained by inspection (Steel and Torrie, 1960, 453).

5.3 DATA PROCESSING

With over 1 800 gross correlation coefficients, 9 800 partial and 14 multiple

correlation coefficients to be computed, the use of an electronic programmable computer became obligatory. A Burroughs 5 700 computer of the University of Natal processed the data, solving the various problems programmed. Test runs for a limited number of computations were made for each type of correlation coefficient. These results were checked with an electronic pocket-computer before the B5 700 completed the required sets of calculations.

5.4 RESULTS AND INTERPRETATIONS

5.4.1 Causality

Existence of correlation does not always indicate direct causal relationship between two variables; nor, even if causal relationship exists, does it always show in which direction it operates (Lavin, 1965, 46; Cattell and Butcher, 1968, 217).

Since product-moment correlations do not imply cause-and-effect between two factors, the observer's experience and logic must determine cause-and-effect (Boone, 1966, 37).

5.4.2 Analysis Procedure

Gross correlation coefficients were computed for eighteen of the nineteen variables under consideration. The variable omitted was teacher-oriented interests as the correlational analysis required a single score for each variable and it was not possible to obtain a single valid score for this variable from the eight subscores provided by the instrument used.

Correlation coefficients were computed for each group: SP; JS; DIP.; B. Paed and Total. Each variable was correlated with every other variable. (See Appendix C for gross correlation coefficients).

Two variables were excluded from consideration for the partial correlational analysis. They were residence and parent's education which were excluded for the following reasons: the distribution for residence was heavily distorted

and made inferences unreliable; parent's education had revealed nothing that father's education and mother's education had not already disclosed.

Gross correlation coefficients had revealed that the influence on academic performance of certain variables was negligible: for example, age (-0,033), time (-0,037) for SP; mother's education (0,047), age (-0,061) for Dip.; study facilities (-0,002), sex (0,000) for B.Paed. Many of these were omitt in the partial correlational analysis, where, for each group, nine variables that correlated most with academic performance were selected. The partial correlation coefficients were computed between the dependent variable (academic performance at university) and each independent variable chosen; with the variables partialled out assuming all possible combinations of the independent variables that remained.

Those partial coefficients singled out for discussion are presented in tables in this chapter. From the original list of nineteen variables three were excluded from the multiple correlation analysis. They are teacher-oriented interests, parent's education and residence. The reasons for their exclusion have been stated earlier. Multiple correlation coefficients were computed for each group. Beginning with the combined effect of two variables on the dependent variable, successive computations examined the combined effect of 3,4,5,.....,16 variables, respectively, on the dependent variable(academic performance); (See Appendix D for multiple correlation coefficients).

The results for each variable studied will now be analysed and interpreted.

5.4.2.1 Scholastic Aptitude

See Appendix C2 for gross correlation coefficients between scholastic aptitud and the other variables.

The correlation coefficients between scholastic aptitude and academic

performance are very small for all groups, ranging from 0,013 for Total to 0,082 for B.Paed. The relationship, therefore, between these two variables is negligible. These findings are consistent with those reported by Brandford (1961) and Miller (1970) but are contrary to those of Furneaux (1962 Lavin (1965) and Astin (1971).

The correlation coefficients between scholastic aptitude and high school achievement are low as the values of 0,114 for Diploma and 0,125 for B.Paed indicate.

For the Diploma students a correlation of 0,294, which is significant at the 1% level, exists between scholastic aptitude and extraversion. This suggests that among Diploma students, extraverts have higher scholastic aptitude scores than introverts. This situation is similar to those reported by Martray (1971) and Mehryar, *et al* (1973) but is not consistent with under-graduate findings by, *inter alia*, Sandford (1962), Entwhistle and Entwhistle (1970). For the B.Paed, however, the correlation is negative (-0,016) but not significant.

Scholastic aptitude has a negative correlation (-0,191) with neuroticism for the Diploma and a positive correlation (0,173) for B.Paed students. Neither coefficient is significant at the 5% level. These results do not confirm overseas findings that high neuroticism is associated with high ability (Entwhistle and Brennin, 1970; Beyer, 1971; Sumner and Warburton, 1972).

Father's occupation and father's and mother's education have trivial correlations with scholastic aptitude.

PERCENTAGE DETERMINATION

Table 5.1 shows

(i) The correlation coefficient r_{12}, where r_{12} represents the gross

correlation between academic performance (1) and scholastic ability (2).

(ii) The percentage of variability in 1 determined by 2.

TABLE 5.1

GROSS CORRELATION COEFFICIENTS AND PERCENTAGE VARIABILITY DETERMINED BY THE INCLUSION OF SCHOLASTIC APTITUDE AS A FACTOR

GROUP	GROSS r	VARIABILITY DETERMINED (%)
	r_{12}	%
SP	0,029	0,08
JS	0,079	0,62
DIP	0,033	0,11
B.PAED	0,828	0,67
TOTAL	-0,013	0,02

An examination of the last column in Table 5.1 reveals that scholastic aptitude accounted for a negligible amount (less than 1%) of the variability in academic performance for each group.

5.4.2.2 High-School Achievement

See Appendix C3 for gross correlation coefficients between high-school achievement and the other variables.

High-school achievement has a significant negative correlation with academic performance for the Total. The correlation coefficient of -0,303 is significant at the 1% level. This indicates that among Education students, the lower achievers in the matriculation examination are performing better at university. This contradicts the findings of Brandford (1961), Iliffe (1968) and Astin (1971). The B.Paed, however, correlates positively when

high-school achievement is compared with university performance. The correlation of 0,117 is not significant at the 5% level.

For all groups, high-school achievement is negatively correlated with father's occupation and with father's and mother's education. For the Diploma the correlation is significant at the 5% level. The inference suggested is that students with less-educated parents do better in the matriculation examination than do students with better-educated parents.

PARTIAL CORRELATION

Partial correlational analysis revealed that academic peformance at university and high school achievement become significantly correlated for the SP as well when the influences of certain variables are controlled.

Examine Table 5.2

TABLE 5.2 (S.P.)

PARTIAL CORRELATION COEFFICIENTS BETWEEN ACADEMIC PERFORMANCE AND HIGH-SCHOOL ACHIEVEMENT

VARIABLES INVOLVED IN PARTIAL CORRELATION	COEFFICIENTS
r_{13}	-0,257
$r_{13.14}$	-0,340*
$r_{13.9\ 14}$	-0,402*
$r_{13.59\ 14}$	-0,426*
	* - significant at 5%

The above table reveals that the correlation between academic performance (1) and high-school achievement (3) becomes significant at the 5% level when the influence of part-time commitments (14) is controlled. The inference is that

since high part-time involvement is associated with lower university achievement (See Appendix C14), the partialing out of this factor results in an improvement in university performance. Table 5.2 also reveals that the correlation increases further if two more factors that suppress attainment at university, viz. neuroticism (5) (See Appendix C5) and mother's educatio (9) (See Appendix C9) are controlled.

MULTIPLE CORRELATION

See Appendix D for coefficients of multiple correlation

Table 5.3 shows

(i) The multiple correlation coefficient $R_{1.23}$ i.e. the multiple correlation between academic performance (1) and the independent variables represented by 2 and 3.

(ii) The increase in percentage determination as a result of the inclusion of high-school achievement (3).

TABLE 5.3

MULTIPLE CORRELATION COEFFICIENTS AND PERCENTAGE VARIABILITY DETERMINED BY THE INCLUSION OF HIGH-SCHOOL ACHIEVEMENT AS A FACTOR

GROUP	$R_{1.2\ 3}$	VARIABILITY DETERMINED (%)
SP	0,260	6,66
JS	0,113	0,65
DIP.	0,142	1,91
B.PAED	0,206	3,57
TOTAL	0,304	9,21

The proportion of variability in academic performance (1) accounted for by high-school achievement (3) is shown in the last column of Table 5.3. High school achievement accounts for 9,21% of the variability in academic performance of the Total and 6,66% of the variability in academic performance of SP.

These findings endorse those made on previous pages from gross r and partial r that high-school achievement is significantly correlated with academic performance for the Total and SP as a sub-group, respectively.

5.4.2.3 Extraversion

See Appendix C4 for gross correlation coefficients between extraversion and the other variables.

Extraversion is positively correlated with academic performance for Diploma (0,20) and negatively correlated for B.Paed (-0,03). Neither figure is significant at the 5% level. This finding fails to support the widely acknowledged hypothesis of the Western world that introversion is strongly related to academic achievement at university (See Chapter Two, p. 18).

The correlations between extraversion, scholastic aptitude and high-school achievement have already been discussed in this chapter.

For all groups extraversion shows a consistent negative correlation with neuroticism. The coefficient is significant at the 5% level for B.Paed (-0,314 and Total (-0,203). This would imply that students who are more extraverted are less neurotic, and that greater instability lies with the introvert.

For the Diploma and B.Paed, extraversion is negatively correlated with commuter time. The correlation of -0,299 is significant for the B.Paed at the 5% level. From this one can infer that extraverts take less time to reach the university. Appendix C4 shows that the fathers of the B.Paed extraverts are in higher educational levels and occupational levels than the other groups and,

therefore, probably use better transport facilities.

For all groups extraversion is negatively correlated with part-time commitments. No coefficients are significant at the 5% level.

For both Diploma and B.Paed, extraversion is positively related to home regime The correlation of 0,466 for the B.Paed is significant at the 1% level. One may infer from this that homes that are run democratically are associated with high extraversion. Introverts generally come from authoritarian homes.

For all groups extraversion has a consistent negative correlation with financial aid. None of the coefficients is significant at the 5% level.

PARTIAL CORRELATION

For all groups gross correlation coefficients between extraversion and academic performance at university were not significant. However, when the partial correlation coefficients were computed, significant correlations were obtained for two groups, SP and Diploma.

Partial correlation coefficients for SP are given in Table 5.4

TABLE 5.4 (SP)

PARTIAL CORRELATION COEFFICIENTS BETWEEN ACADEMIC PERFORMANCE AND EXTRAVERSTION

VARIABLES INVOLVED IN PARTIAL CORRELATION	COEFFICIENTS
r_{14}	0,142
$r_{14.389\ 14}$	0,375*
	* - significant at 5%

The above table reveals that, if the effects of high-school achievement (3);

father's education (8); mother's education (9) and part-time commitments (14 are partialed out, the correlation between extraversion and academic performance becomes significant at the 5% level. This finding is supported by Martray (1971) and Mehryar *et al*, (1973).

The writer draws the following inferences:

It has already been established that extraversion is positively related to academic performance (gross r = 0,142). But SP extraverts are characterised by: low levels of father's education; better educated mothers and greater part-time involvement (See Appendices C4). These characteristics are all detrimental to academic performance (See Appendix C1) and prevent the extrave from performing as well as he should. However, if they are controlled, then extraversion correlates significantly with academic performance for the SP.

The partial correlation coefficients for the Diploma appear in Table 5.5

TABLE 5.5 (DIP)

PARTIAL CORRELATION COEFFICIENT BETWEEN ACADEMIC PERFORMANCE AND EXTRAVERSION

VARIABLES INVOLVED IN PARTIAL CORRELATION	COEFFICIENTS
r_{14}	0,199
$r_{14.8}$	0,206*
	* - significant at 5%

Table 5.5 indicates that for the Diploma students the partialing out of the influence of father's education (8) causes the correlation between extraversion (4) and academic performance (1) to become significant at the 5% level.

The inference indicated is that the Diploma extraverts who are handicapped by less educated fathers (8) are likely to improve their academic performance if this handicap could be overcome.

MULTIPLE CORRELATION

See Appendix D for coefficients of multiple correlation.

Table 5.6 shows

(i) The multiple correlation coefficient $R_{1.234}$ i.e. the multiple correlation coefficient between academic performance (1) and the independent variables represented by 2,3 and 4.

(ii) The increase in percentage determination as a result of the inclusion of extraversion (4).

TABLE 5.6

MULTIPLE CORRELATION COEFFICIENTS AND PERCENTAGE VARIABILITY DETERMINED BY THE INCLUSION OF EXTRAVERSION AS A FACTOR

GROUP	$R_{1.2\ 3\ 4}$	VARIABILITY DETERMINED (%)
SP	0,300	2,23
JS	0,235	4,24
DIP.	0,231	3,33
B.PAED	0,206	0,02
TOTAL	0,320	0,98

The above table indicates that extraversion accounts for 4,24% of the variability in the academic performance of JS, 3,33% of the variability of

Diploma and 2,23% of SP. The percentages for the remaining two groups are negligible.

These percentages are expected since our earlier findings showed that extraversion is significantly correlated with academic performance for SP and Diploma.

5.4.2.4 Neuroticism

See Appendix C5 for gross correlation coefficients between neuroticism and the other variables.

For the Diploma students a negative correlation exists between neuroticism and academic performance. The highest coefficient -0,191 for SP is not significance at the 5% level. This finding of absence of significance is supported by Cowell and Entwhistle (1971) and Entwhistle and Entwhistle (1971) The correlation coefficient for B.Paed is positive (0,088) but small.

The relationships between neuroticism and the factors scholastic aptitude and extraversion have been discussed earlier in this chapter.

For all groups neuroticism is positively correlated with mother's education. The correlation is significant for the Total (0,21) and Diploma (0,226) at the 5% level. The SP correlation of 0,314 misses significance at the 5% level (0,333). The inference drawn is that greater neuroticism prevails in homes with better-educated mothers. It would appear that the higher the education of the mother the greater the neuroticism in her sons and daughters.

For all groups neuroticism is negatively correlated with home regime. The correlation is significant at the 5% level for the Total (-0,202) and the B.Paed (-0,333). This would point to autocratic parents being associated with those students with higher neuroticism scores.

MULTIPLE CORRELATION

See Appendix D for coefficients of multiple correlation.

Table 5.7 shows

(i) The multiple correlation coefficient $R_{1.2\ 3\ 4\ 5}$ i.e. the multiple correlation coefficient between academic performance (1) and the independent variables represented by 2, 3, 4 and 5.

(ii) The increase in percentage determination as a result of the inclusion of neuroticism (5).

TABLE 5.7

MULTIPLE CORRELATION COEFFICIENTS AND PERCENTAGE VARIABILITY DETERMINED BY THE INCLUSION OF NEUROTICISM AS A FACTOR

GROUP	$R_{1.2345}$	VARIABILITY DETERMINED (%)
SP	0,406	7,50
JS	0,252	0,85
DIP.	0,266	1,74
B.PAED	0,235	1,26
TOTAL	0,324	0,26

The only group for which neuroticism contributes substantially to the variability in academic performance is SP where the percentage is 7,5. This confirms our findings from gross r where the correlation coefficient between neuroticism and academic performance was the highest (-0,191) for SP.

5.4.2.5 Commuter Time

See Appendix C7 for gross correlation coefficients betwen commuter time and

the other variables.

Commuter time correlated negatively with academic performance for the B.Paed, Total and Diploma. The correlation coefficient of -0,309 for the B.Paed was significant at the 5% level. This indicates that commuter time is an importa factor in the academic performance of B.Paed students. Those who travel for longer periods do not perform as proficiently as those who take less commuter time to reach the university. This findings is supported by Olsen (1957), Foster (1959) and Malleson (1963) and contrary to that of Berg (1973)

The correlation between time and extraversion has been discussed already.

For all groups father's education correlates negatively with commuter time. Correlation coefficients are significant for the SP at the 1% level (-0,424) and for the Diploma at the 5% level (-0,338). The inference suggested is that the fathers of those students who take a long time to travel have a lower standard of education. Such students probably belong to the lower levels of socio-economic status, living in the outlying areas and using public transport to university.

The findings for mother's education are similar to those of father's education above.

For all groups father's occupation correlates negatively with commuter time. The correlation is significant for the Diploma students at the 1% level (-0,279). This implies that those students who take longer to travel to the university come from homes with fathers in the lower levels of occupation.

For all groups commuter time correlates significantly with study facilities at the 1% level. The inference suggested is that those who take a longer time to travel have poorer study facilities at home.

For all groups commuter time correlates negatively but not significantly with home regime.

For the Diploma students, commuter time is significantly correlated with sex at the 5% level. This suggests that Diploma females take less time to reach the university than males. The probable reasons for this are:

(i) girls come from higher socio-economic backgrounds than males, and are thus in a position to use better travel facilities than males, and

(ii) most Indian parents make special travel provisions for their daughters.

For the Diploma students time is significantly correlated with career aspirations. The correlation coefficient of 0,259 is significant at the 5% level. The inference made here is that the student from the poorer socio-economic background has a higher aspiration for teaching as a career.

MULTIPLE CORRELATION

See Appendix D for coefficients of multiple R.

Table 5.8 shows

(i) The multiple correlation coefficient $R_{1.2\ 3\ 4\ 5\ 7}$ i.e. the multiple correlation coefficient between academic performance (1) and the independent variables represented by 2,3,4,5 and 7.

(ii) The increase in percentage determination as a result of the inclusion of commuter time (7).

Table 5.8 shows that time accounts for 10,84% of variability in academic performance for B.Paed. This confirms the earlier findings that time is significantly correlated (gross r) with academic performance for B.Paed.

TABLE 5.8

MULTIPLE CORRELATION COEFFICIENTS AND PERCENTAGE VARIABILITY DETERMINED BY THE INCLUSION OF COMMUTER TIME AS A FACTOR

GROUP	$R_{1.2\ 3\ 4\ 5\ 7}$	VARIABILITY DETERMINED (%)
SP	0,411	0,30
DIP.	0,270	0,00
B. PAED	0,435	10,84
JS	0,278	0,06
TOTAL	0,352	1,17

5.4.2.6 Father's Education

See Appendix C8 for gross correlation coefficients between father's education and the other variables.

Father's education has a positive correlation with academic performance for the Diploma students (0,128) and a very small negative correlation (-0,06) for B.Paed. The correlation coefficients are not significant at the 5% level and are similar to the findings of Ennis (1973). The absence of significant correlation between father's education and academic performance in this study is contrary to those obtained by Boone (1968), Glenn (Senior) (1971) and Al Bassam (1973).

The relationship between time and father's education, and between high-school achievement and commuter time have been discussed already.

For all groups father's education has a positive, significant correlation with mother's education. Correlation coefficients ranging from 0,566 to 0,606 are all significant at the 1% level. The inference suggested is that in individual homes the mother's education matches that of the father's.

Results similar to those between father's education and mother's education were obtained for the correlations between father's occupation and father's education. The correlation coefficients between father's education and father's occupation are significant for all groups at the 1% level, with coefficients ranging from 0,385 to 0,801. This reveals that the occupations of fathers are compatible with their education.

For all groups correlation coefficients between father's education and sex are negative. Correlation coefficients are significant at the 5% level for the Diploma (-0,270) and Total (-0,229). This indicates that female students come from homes with better-educated fathers.

For all groups father's education is negatively correlated with financial aid. Correlation coefficients are significant at the 5% level for the Total (-0,217) and JS (-0,275). This implies that bursars came from homes where fathers have poorer educational qualifications.

For all groups father's education is negatively correlated with career aspiration. The correlations are not significant.

MULTIPLE CORRELATION

See Appendix D for coefficients of multiple correlation.

Table 5.9 shows

(i) Multiple correlation coefficient $R_{1.234578}$ i.e. the multiple correlation between academic performance (1) and the independent variables 2,3,4,5,7 and 8.

(ii) Increase in percentage determination as a result of the inclusion of father's education (8).

TABLE 5.9

MULTIPLE CORRELATION COEFFICIENTS AND PERCENTAGE VARIABILITY DETERMINED BY THE INCLUSION OF FATHER'S EDUCATION AS A FACTOR

GROUP	$R_{1.2\ 3\ 4\ 5\ 7\ 8}$	VARIABILITY DETERMINED (%)
SP	0,422	0,97
JS	0,320	2,53
DIP.	0,299	1,67
B.PAED	0,443	0,75
TOTAL	0,354	0,19

The above table reveals that in all groups, with the possible exception of JS, father's education contributes little to the variability in academic performance.

5.4.2.7 Mother's Education

See Appendix C9 for gross correlation coefficients between mother's educati and the other variables.

It is observed that for the B.Paed and SP the coefficients are negative, -0,126 and -0,140 respectively. However, for all groups the correlations between mother's education and academic performance are not significant at the 5% level. This finding is consistent with those of Himmelweit and Summerfield (1957) and Iliffe (1968) but contrary to those of Brown and du Bois (1964), Astin (1970, 43) and Cavendar (1974).

The relationships between mother's education and the factors high-school achievement, neuroticism, commuter time and father's education, have already been discussed.

For all groups mother's education is negatively correlated with part-time commitments. None of the coefficients is significant at the 5% level.

For all groups mother's education is negatively correlated with sex. Correlation coefficients for Diploma (-0,253) and Total (-0,235) are significant at the 5% level. These results suggest that female students come from homes with better-educated mothers than do male students.

For all groups mother's education is negatively correlated with financial aid. Correlations are not significant at the 5% level.

PARTIAL CORRELATION

Partial correlational analysis disclosed that for the SP group, mother's education becomes significantly correlated with academic performance if the influences of certain factors are controlled, and this is presented in Table 5.10

TABLE 5.10 (SP)

PARTIAL CORRELATION BETWEEN ACADEMIC PERFORMANCE AND MOTHER'S EDUCATION

VARIABLES INVOLVED IN PARTIAL CORRELATION	COEFFICIENTS
r_{19}	-0,140
$r_{19.\ 348\ 14}$	-0,403*
	* - significant at 5%

The above table indicates that if the effects of high-school achievement (3) extraversion (4), father's education (8) and study facilities (12) are partialed out, then the correlation between mother's education and academic performance becomes significant at the 5% level. Note that the relationship is inverse.

The inference suggested is explained as follows: The negative gross correlation of -0,140 indicates that generally better-educated mothers are associated with lower academic achievement. Since high extraversion, better-educated fathers, better study facilities and poorer matric performance are all associated with better university academic performance, the partialin out of these factors would increase the detrimental influence of better-educated mothers on university achievement.

MULTIPLE CORRELATION

See Appendix D for coefficients of multiple correlation.

Table 5.11 shows

(i) The multiple correlation coefficient, $R_{1.\ 2345789}$ i.e. the multiple correlation coefficient between academic performance (1) and the independent variables represented by 2,3,4,5,7,8 and 9.

(ii) The increase in percentage determination as a result of including mother's education (9).

TABLE 5.11

MULTIPLE CORRELATION COEFFICIENTS AND PERCENTAGE VARIABILITY DETERMINED BY THE INCLUSION OF MOTHER'S EDUCATION AS A FACTOR

GROUP	$R_{1.2\ 3\ 4\ 5\ 7\ 8\ 9}$	VARIABILITY DETERMINED (%)
SP	0,509	8,11
JS	0,328	0,47
DIP.	0,301	0,11
B.PAED	0,454	0,94
TOTAL	0,355	0

Table 5.11 indicates that SP is influenced to a far greater extent than the other groups by mother's education. Mother's education is responsible for 8,11% of the variability in the academic performance of SP students. This is not unexpected since partial r has already disclosed that mother's education is significantly correlated with academic performance among the SP.

2.4.2.8 Father's Occupation

See Appendix C11 for gross correlation coefficients between father's occupation and the other variables.

For all groups father's occupation is positively correlated with academic performance. The correlation coefficient for JS is significant at the 5% level (0,281). This correlation suggests that the higher the occupational level of the father, the higher the achievement of the student at university. Findings similar to this were made by Sandford (1962), Andrulis (1968) and Chopra (1969, 435).

Correlations between father's occupation and the following factors have already been examined: high-school achievement, commuter time, father's education and mother's education.

For all groups, father's occupation correlates positively with study facilitie The correlation coefficient of 0,173 for the Total is significant at the 5% level. The inference suggested is that better study facilities prevail in homes where fathers are at higher occupational levels.

For all groups, father's occupation has a consistent negative correlation with sex. However, the correlations are not significant.

PARTIAL CORRELATION

Partial correlational analysis revealed that father's occupation becomes significantly correlated with academic performance at the 5% level for the Diploma students.

The gross correlation coefficient between father's occupation (11) and academic performance (1) for Diploma misses significance at the 5% level, 0,191 < 0,204*. However, if the influence of neuroticism (5) and sex (16 are controlled the correlation between father's occupation and academic performance becomes significant at the 5% level. See Table 5.12

TABLE 5.12 (DIP)

PARTIAL CORRELATION COEFFICIENTS BETWEEN ACADEMIC PERFORMANCE AND FATHER'S OCCUPATION

VARIABLES INVOLVED IN PARTIAL CORRELATION	COEFFICIENTS
$r_{1\ 11}$	0,191
$r_{1\ 11.\ 5\ 16}$	0,210*
	* - significant at 5%

The inference suggested is that if neuroticism is partialed out, the adverse influence of mother's education is reduced because neuroticism and mother's education have a high positive correlation of 0,314. It has been shown earlier that mother's education is negatively correlated with academic performance. Therefore, if the influence of mother's education is controlled, the positive correlation between father's occupation and academic performance increases.

With regard to the control of sex as a factor, it must be pointed out that Dip. males perform better at university than females, although female student have the advantages of better-educated fathers (and mothers). If males had similar socio-economic advantages they would do even better.

MULTIPLE CORRELATION

See Appendix D for coefficients of multiple correlation.

Table 5.13 shows

(i) The multiple correlation coefficient $R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11}$ i.e. the multiple correlation coefficient between academic performance (1) and independent variables 2,3,4,5,7,8,9 and 11.

(ii) The increase in percentage determination as a result of the inclusion of father's occupation (11).

TABLE 5.13

MULTIPLE CORRELATION COEFFICIENTS AND PERCENTAGE VARIABILITY DETERMINED BY THE INCLUSION OF FATHER'S OCCUPATION AS A FACTOR

GROUP	$R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11}$	VARIABILITY DETERMINED (%)
SP	0,514	0,43
JS	0,391	4,51
DIP	0,324	1,44
B. PAED	0,460	0,54
TOTAL	0,364	0,71

The above table shows that by far the greatest variability in academic performance explained by father's occupation, occurs with the JS. The percentage variability is 4,51. Gross r has already revealed that father's occupation and academic performance are significantly correlated for JS at the 5% level.

5.4.2.9 Study Facilities

See Appendix C12 for gross correlation coefficients between study facilities

and the other variables.

For the Diploma students study facilities have a moderate positive correlatio with academic performance but the correlation is not significant at the 5% level. For the B.Paed the relationship is negligible. These findings agree with those of Olsen (1957) and Malleson (1959).

The correlation between study facilities and the two variables – father's occupation and commuter time, have already been discussed.

For all groups study facilities are negatively correlated with sex. Correlation coefficients are significant at the 1% level for the Total and at the 5% level for the B.Paed and the Diploma. This implies that females have significantly better study facilities than males. This is not unexpecte when it is realized that female students generally come from higher socio-economic levels than male students.

For the SP students study facilities have a significant, negative correlation with financial aid. The figure of -0,331 is significant at the 5% level. The implication is that bursars have poorer study facilities. This also mean that students from poorer socio-economic backgrounds have done better in their matriculation.

PARTIAL CORRELATION

Partial correlational analysis revealed that study facilities become significantly correlated with academic performance (1) for the JS and Diploma groups when the influence of sex (16) and career aspirations (9) are controlled.

UNIVERSITY OF DURBAN LIBRARY

Examine Tables 5.14 and 5.15

TABLE 5.14 (JS)

PARTIAL CORRELATION COEFFICIENTS BETWEEN ACADEMIC PERFORMANCE AND STUDY FACILITIES

VARIABLES INVOLVED IN PARTIAL CORRELATION	COEFFICIENTS
$r_{1.\ 12}$	0,208
$r_{1\ 12.\ 16\ 19}$	0,268*
	* - significant at 5%

TABLE 5.15 (DIPLOMA)

VARIABLES INVOLVED IN PARTIAL CORRELATION	COEFFICIENTS
$r_{1.\ 12}$	0,171
$r_{1\ 12.\ 16\ 19}$	0,236*
	* - significant at 5%

Tables 5.14 and 5.15 indicate that the same factors, sex and career aspiratio have to be held constant to obtain significant correlations for both groups.

The interpretation made from the partial correlations is that, since males perform better academically than females (gross r = 0,229) - in spite of inferior study facilities when compared with females (gross r = 0,122), males would perform even better if they had the same study facilities as the females.

With regard to the partialing out of career aspirations, the following inferences are made: Better study facilities exist in the higher socio-economic groups who are associated, however, with lower career aspirations (See Appendix C19); career aspirations are positively correlated with academic performance; the advantages of superior study facilities are negated by low career aspirations — but if, however, career aspiration is held constant, students with superior study facilities would perform even better academically.

MULTIPLE CORRELATION

See Appendix D for coefficients of multiple correlation.

Table 5.16 shows

(i) The mutliple correlation coefficient $R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11\ 12}$ i.e. multiple correlation between academic performance and the independent variables represented by 2,3,4,5,8,9,11 and 12.

(ii) The increase in percentage determination as a result of the inclusion of study facilities (12).

TABLE 5.16

MULTIPLE CORRELATION COEFFICIENTS AND PERCENTAGE VARIABILITY DETERMINED BY THE INCLUSION OF STUDY FACILITIES AS A FACTOR

GROUP	$R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11\ 12}$	VARIABILITY DETERMINED (%)
SP	0,517	0,33
JS	0,464	6,33
DIP.	0,375	3,57
B.PAED	0,365	0,06
TOTAL	0,365	0,06

Table 4.16 indicates that two groups, JS and Diploma, are influenced to some extent by study facilities. The amount of variability in academic performance explained by study facilities for the JS and the Diploma is 6,33% and 3,57% respectively. These findings confirm those disclosed by partial correlation; that for the JS and Diploma, study facilities are significantly correlated with academic performance at the 5% level.

2.4.2.10 Home Regime

See Appendix C13 for gross correlation coefficients between home regime and the other variables.

There is a positive correlation between home regime and academic performance for the Diploma students (0,116). For the B.Paed the correlation is negative (-0,083). Neither coefficient is significant at the 5% level. Home regime alone is not very important for academic performance. This result is contrary to the hypothesis emerging from Western countries (Lavin, 1965, 148; Daniëls, 1970, 67; McCall and Thomas (1974).

The correlations between home regime and the factors extraversion and commuter time, have already been discussed.

MULTIPLE CORRELATION

See Appendix D for coefficients of multiple correlation.

Table 5.17 shows

(i) The multiple correlation coefficient $R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11\ 12\ 13}$ i.e. the multiple correlation coefficient between academic performance (1) and the independent variables represented by 2,3,4,5,8,9,11,12 and 13.

(ii) The increase in percentage determination as a result of the inclusion of home regime (13).

TABLE 5.17

MULTIPLE CORRELATION COEFFICIENTS AND PERCENTAGE VARIABILITY DETERMINED BY THE INCLUSION OF HOME REGIME AS A FACTOR

GROUP	$R_{1.2\ 3\ 4\ 5\ 7\ 8\ 9\ 11\ 12\ 13}$	VARIABILITY DETERMINED (%)
SP	0,533	1,68
JS	0,468	0,29
DIP	0,387	0,95
B.PAED	0,468	0,01
TOTAL	0,366	0,05

Table 5.17 confirms gross correlation findings that for all groups home regime has little relationship with academic performance.

2.4.2.11 Part-Time Commitments

See Appendix C14 for gross correlation coefficients between part-time commitments and the other variables.

For the SP (0,267) and B.Paed (0,176) part-time commitments have a positive correlation with academic performance. These values are not significant at the 5% level. This finding is similar to those of Kinsey (1972), Melicher (1973) and Thomas (1974).

The relationship between part-time commitments and the factors extraversion, neuroticism, mother's education and study facilities, have already been discussed.

For all groups part-time commitments are negatively correlated with sex. The correlations are significant for the Total (-0,222) and the Diploma (-0,204) at the 5% level. The negative correlation implies that more males

are involved in part-time work than females.

PARTIAL CORRELATION

Partial correlational analysis revealed that for SP, part-time commitments (1 become significantly correlated with academic performance, if high-school achievement (3) and extraversion (4) are controlled. See Table 5.18

TABLE 5.18 (S.P.)

PARTIAL CORRELATION COEFFICIENTS BETWEEN ACADEMIC PERFORMANCE AND PART-TIME COMMITMENTS

VARIABLES INVOLVED IN PARTIAL CORRELATION	COEFFICIENTS
$r_{1\ 14}$	0,267
$r_{1\ 14.34}$	0,397*
	* - significant at 5%

This is explained as follows. If the better achieving SP extraverts, who are also poorer performers in the matriculation examination, are excluded from the SP group, the poorer performance of the remaining students (introverts) will correlate significantly with part-time commitments. This finding is similar to that of Harding (1974).

MULTIPLE CORRELATION

See appendix D for coefficients of multiple correlation.

The following table 5.19 shows

(i) The multiple correlation coefficient $R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11\ 12\ 13\ 14}$ i.e the multiple correlation coefficient between academic performance (1) and the independent variables represent by 2,3,4,5,7,8,9,11,12,13 and 14.

(ii) The increase in percentage determination as a result of the inclusion of part-time commitments.

TABLE 5.19

MULTIPLE CORRELATION COEFFICIENTS AND PERCENTAGE VARIABILITY DETERMINED BY THE INCLUSION OF PART-TIME COMMITMENTS AS A FACTOR

GROUP	$R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11\ 12\ 13\ 14}$	VARIABILITY DETERMINED (%)
SP	0,375	9,18
JS	0,473	0,48
DIP	0,392	0,35
B.PAED	0,540	0
TOTAL	0,378	0,86

The above table indicates that for the SP part-time commitments contribute substantially to the variability in academic performance. The percentage variability accounted for is 9,18. It will be recalled that for SP partial r disclosed that part-time commitments correlate significantly with academic performance.

5.4.2.12 Age

See Appendix C15 for gross correlation coefficients between age and the other variables.

For the Diploma students the correlation coefficients between age and academic performance are negligible. The correlation coefficient of 0,149 for the B.Paed is also not significant at the 5% level.

These findings are similar to those of Himmelweit and Summerfield (1951). Hopkins *et al*, (1958) and to those reported by van Wyk de Vries *et al*, (1974).

However, they are contrary to the findings of Husemoller (1969), Ryan (1969), Herridge(1971), Berg (1973) and Lawry (1973).

The correlation coefficients between age and the factors high-school achievement, extraversion and study facilities, have already been discussed.

MULTIPLE CORRELATION

See Appendix D for coefficients of multiple correlation.

Table 5.20 shows

(i) The multiple correlation coefficient $R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11\ 12\ 13\ 14\ 15}$ i.e. the multiple correlation coefficient between academic performance (1) and the independent variables represented by 2,3,4,5,7,8,9,11,12, 13,14 and 15.

(ii) The increase in percentage determination as a result of the inclusion of age (15).

TABLE 5.20

MULTIPLE CORRELATION COEFFICIENTS AND PERCENTAGE VARIABILITY DETERMINED BY THE INCLUSION OF AGE AS A FACTOR

GROUP	$R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11\ 12\ 13\ 14\ 15}$	VARIABILITY DETERMINED (%)
35	0,617	0,53
57	0,476	0,19
92	0,396	0,28
42	0,553	1,47
134	0,380	0,21

The above table confirms the earlier findings in respect of age. Age

accounts for a negligible part of the variability in academic performance for all groups.

5.4.2.13 Sex

See Appendix C16 for gross correlation coefficients between sex and the other variables.

All the correlation coefficients between sex and academic performance are positive but not significant. The thesis that females perform better than males is not supported. The finding is contrary to most findings in Western cultures (See Chapter Two, p. 28).

The correlations between sex and the factors neuroticism, commuter time, mother education, father's education, study facilities and part-time commitments, have already been discussed.

For all groups correlations between sex and financial aid are positive. The correlation coefficient of 0,364 is significant for the SP. This implies that male bursars out-number female bursars.

PARTIAL CORRELATION

Partial correlational analysis revealed that for the Diploma and JS, sex becomes significantly correlated with academic performance if the effects of certain variables are partialed out.

TABLE 5.21 (DIPLOMA)

PARTIAL CORRELATION COEFFICIENT BETWEEN ACADEMIC PERFORMANCE AND SEX

VARIABLES INVOLVED IN PARTIAL r	COEFFICIENTS
$r_{1.\ 16}$	0,152
$r_{1\ 16.\ 8\ 12}$	0,237*
	* - significant at 5%

TABLE 5.22 (JS)

PARTIAL CORRELATION COEFFICIENT BETWEEN ACADEMIC PERFORMANCE AND SEX

VARIABLES INVOLVED IN PARTIAL r	COEFFICIENTS
$r_{1\ 16}$	0,229
$r_{1\ 16.\ 8}$	0,276*
	* - significant at 5%

For the Diploma (Table 5.21) the partialing out of father's education (8) and study facilities (12) has the following consequences: male Diploma students already do better academically (gross r = 0,152) than female students who enjoy the benefits of better-educated fathers (gross r = -0,270) and superior study facilities (-0,217). Males would do significantly better if they had the same advantages as the females.

For the JS (Table 5.22) the significant correlation between sex (16) and academic performance (1), obtained by holding father's education constant is explained as follows: girls generally come from homes where the father's educational standard is high and hence his occupational level also high, and where, as a result, superior study facilities prevail. In spite of these advantages female academic performance is inferior to that of the male. If the males had the same advantages they are likely to do even better; in fact, significantly better.

MULTIPLE CORRELATION

See Appendix D for coefficients of multiple correlation.

Table 5.23 shows

(i) The multiple correlation coefficient $R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11\ 12\ 13\ 14\ 15\ 16}$

i.e. the multiple correlation coefficient between academic performance (1) and the independent variables 2,3,4,5,7,8,9,11,12,13,14,15 and 16.

(ii) The increase in percentage determination as a result of the inclusion of sex (16).

TABLE 5.23

MULTIPLE CORRELATION COEFFICIENTS AND PERCENTAGE VARIABILITY DETERMINED BY THE INCLUSION OF SEX AS A FACTOR

GROUP	$R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11\ 12\ 13\ 14\ 15\ 16}$	VARIABILITY DETERMINED (%)
SP	0,620	0,28
JS	0,530	5,45
DIP	0,439	3,63
B.PAED	0,553	0
TOTAL	0,383	0,17

The above table shows that two groups, JS and Diploma, are influenced to some extent by sex. In the JS group 5,45% of the variability in academic performance is explained by sex while in the Diploma group the percentage is 3,63. Partial r has already disclosed that for these two groups, sex is significantly correlated with academic performance.

5.4.2.14 Financial Aid

See Appendix C17 for gross correlation coefficients between financial aid and the other variables.

The correlation coefficient between financial aid and academic performance is negative for every group and just misses significance for the Total (-0,164) at the 5% level (-0,169*), suggesting that non-bursars have done better

academically than bursars but not "significantly" better. This finding is supported by those of Knight (1966), Beyer (1971), Snyder (1971) and Winder (1972).

The correlation coefficients between financial aid and the factors high-school achievement, extraversion, father's education, mother's education, study facilities, age and sex, have already been discussed.

PARTIAL CORRELATION

Partial correlational analysis disclosed that for the Total, financial aid becomes significantly correlated with academic achievement at the 5% level if time is held constant.

See Table 5.24

TABLE 5.24 (TOTAL)

PARTIAL CORRELATION COEFFICIENT BETWEEN ACADEMIC PERFORMANCE AND FINANCIAL AID

VARIABLES INVOLVED IN PARTIAL r	COEFFICIENTS
$r_{1\ 17}$	-0,164
$r_{1\ 17.\ 7}$	-0,172*
	* - significant at 5%

These results are explained as follows: Non-bursars perform better than bursars (r =-0,164); the gross correlation of -0,164 between financial aid (1) and academic performance (1) just misses significance (significant gross r =-0,169* at the 5% level); non-bursars take longer to travel than bursars (gross r =-0,061) and time affects academic performance adversely; if the time handicap is removed, the non-bursars would perform significantly better (academically) than bursars. Such a finding is consistent with those of

Flook and Saggar (1966, 395) and Worthington and Grant (1971, 7).

MULTIPLE CORRELATION

See Appendix D for coefficients of multiple correlation.

Table 5.25 shows

(i) The multiple correlation coefficient $R_{1\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11\ 12\ 13\ 14\ 15\ 16}$ i.e. the multiple correlation between academic performance (1) and the independent variables represented by 2,3,4,5,7,8,9,11,12,13,14,15,16 and 17.

(ii) The increase in percentage determination as a result of the inclusion of financial aid (17).

TABLE 5.25

MULTIPLE CORRELATION COEFFICIENTS AND PERCENTAGE VARIABILITY DETERMINED BY THE INCLUSION OF FINANCIAL AID AS A FACTOR

GROUP	$R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11\ 12\ 13\ 14\ 15\ 16\ 17}$	VARIABILITY DETERMINED (%)
SP	0,620	0
JS	0,553	2,56
DIP	0,444	0,49
B.PAED	0,563	1,56
TOTAL	0,392	0,76

The above table indicates that the percentage variability in academic performance explained by financial aid is not substantial.

5.4.2.15 Teacher-Career Aspiration

See Appendix C19 for gross correlation coefficients.

Career aspiration is positively related to academic performance for all groups. None of the correlations is significant.

MULTIPLE CORRELATION

See Appendix D for coefficients of multiple correlation.

Table 5.26 shows

(i) The multiple correlation coefficient

$R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11\ 12\ 13\ 14\ 15\ 16\ 17\ 19}$. This multiple correlation is one between academic performance (1) and the independent variables 2,3,4,5,7,8,9,11,12,13,14,15,16,17 and 19.

(ii) The increase in percentage determination as a result of the inclusion of career aspirations (19).

TABLE 5.26

MULTIPLE CORRELATION COEFFICIENTS AND PERCENTAGE VARIABILITY DETERMINED BY TH INCLUSION OF CAREER ASPIRATION AS A FACTOR

GROUP	$R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11\ 12\ 13\ 14\ 15\ 16\ 17\ 19}$	VARIABILITY DETERMINED (%)
SP	0,629	1,20
JS	0,565	1,32
DIP	0,457	1,10
B.PAED	0,573	1,16
TOTAL	0,392	0,76

The above table reveals that career aspiration does not contribute much to the variability in academic performance in any group.

CHAPTER SIX

6. SUMMARY OF INVESTIGATION AND RECOMMENDATIONS

6.1 SUMMARY OF INVESTIGATION

6.1.1 The Nature and Significance of the Problem Investigated

The problems of high failure rate and drop-out at university are international. A student's failure at university is a painful experience both financially and personally. Since the objectives of universities and colleges are to educate and prepare for graduation the students they admit, academic failure must be viewed as a failure on the part of these institutions as well as on the part of the individual students. The ever-increasing growth in university enrolment has spotlighted the need for promoting greater success at university.

Since educated people are among the nation's best resources, and education is one of the chief assets of the individual, there is a compelling need for research in order to identify factors that affect academic performance, especially at tertiary level.

Failure and wastage at university are heaviest in the first year. Students are admitted to university mainly on the strength of the matriculation results. Recognition of the fact that some students perform better and some worse than predicted by matriculation results has led to a search for other factors involved. While overseas universities have done a fair amount of research in this connection, comparatively little has been done in South Africa.

6.1.2 The Purpose of This Investigation

The purpose of this investigation was to identify the factors that affected the academic performance of first-year students in the Faculty of Education at the University of Durban-Westville and to establish the extent to which these factors influenced academic success or failure.

There were two main reasons for undertaking this investigation: Firstly, like universities the world over, the University of Durban-Westville experiences the problem of high failure rate, especially among its first-ye students, and the problem has not been resolved. Secondly, because of the substantial differences between universities, not only in different countries but also in the same country, it is necessary for a young university like Durban-Westville to have its own reservoir of research findings on which to formulate its educational policies.

6.1.3 Literature Survey and Selection of Factors for Study

A review of the literature suggested numerous factors that were found to influence academic performance of first-year university students. Those factors eventually selected by the writer for investigation were separated into two categories: psychological and sociological.

The psychological factors comprised scholastic aptitude, high-school achievement, extraversion, neuroticism and interests.

The sociological factors were commuter time, father's education, mother's education, parent's education, father's occupation, study facilities, home regime, part-time commitments, age, sex, financial aid, residence and teacher-career aspirations.

6.1.4 The Selection, Construction and Administration of Instruments, The Selection of Students

Research has a major purpose: to add a degree of certainty to knowledge

which hitherto has been imprecise. To achieve this greater precision, the researcher relies on valid and reliable assessment instruments. The instruments that recommended themselves for the measurement of certain factors were:-

(a) The end-of-year examination of 1975 of the University of Durban-Westville, to measure the criterion score i.e. academic performance at university.

(b) The Senior Certificate Examinations of 1974 (or earlier) to measure high-school achievement.

(c) Personality Questionnaire form A of the Eysenck Personality Inventory to measure the personality dimensions of extraversion and neuroticism.

(d) Test A/1/2 of the National Institute of Personnel Research of the C.S.I.R. to measure scholastic aptitude.

(e) The Occupational Interest Guide of the Applied Psychology Unit of the University of Edinburgh to measure the interests of the students.

Data relating to the remaining factors of the study were obtained from a questionnaire-type instrument specially constructed for the purpose and named the "Biographical and Sociological Inventory".

Researchers and writers have stressed that, for greater precision, investigations be undertaken on a departmental basis. This investigation was therefore confined to the Faculty of Education of which the writer is a member. The students chosen were all first-year students in the Faculty of Education. The students had enrolled either for a University Diploma in Education or for the Bachelor of Paedogogics degree. The Diploma

students consisted of two groups: the Junior Secondary and Senior Primary. Of those finally selected, the Diploma students numbered ninety-two and the B.Paed. forty-two. There were thirty-five students in the Senior Primary group and fifty-seven in the Junior Secondary. Altogether there were one hundred and thirty-four students involved in the investigation.

High-school achievement, in the form of matriculation examination symbols, was obtained from the university records. Academic performance scores were obtained from the results of the final examination of 1975 of the University of Durban-Westville. The remaining instruments were administered early in the second semester of 1975 and scored immediately after administration.

6.1.5 The Statistical Procedures Employed in Investigation

The statistical procedures selected for this study were: analysis of variance, chi square and correlational analysis.

The analysis of variance was preceded by frequency distributions of the scores of each group for each variable. Means and standard deviations were also calculated for each group where the variable was continuous. Analysis of variance tests were then made of the differences between the mean scores (of continuous variables) of different groups: SP, JS, Diploma, B.Paed., Total.

Chi square was used to test the significance of the differences between two proportions obtained by arranging results in a two-way frequency table.

Correlational analysis involved gross correlation, partial correlation, multiple correlation and multiple determination. Gross correlation established the relationship between any two factors of interest. Where the two variables correlated were continuous, the Pearson product-moment correlation coefficient was used. Where dichotomous variables were involved, the phi

coefficient was used.

Partial correlation established the relationship between any two variables of interest, with the effects of other variables held constant. Partial correlation represents an important extension of the theory and techniques of simple correlation. Variables are invariably impure and hence contaminate correlations. Partial correlation enabled us to identify factors that are over-riding. Multiple correlation determined the degree of relationship between the criterion (academic performance) and a combination of two or more variables affecting the criterion. The coefficient of determination measured the proportion of variation in the dependent variable explained by the independent variables under consideration The computations for the correlational analysis were performed by a Burroughs 5700 computer.

6.1.6 Findings and Implications

6.1.6.1 High-School Achievement

A significant negative correlation exists between high school achievement and academic performance for the Total and SP group. This indicates that for these groups the better achievers in the matriculation are less successful at university.

The analysis revealed that the B.Paed. group had performed significantly better than the Diploma group in the matriculation examination. The JS group had also performed significantly better than the SP group. These results were reversed at university.

These findings are contrary to most findings elsewhere. The Senior Certificate results are therfore not a good predictor of success for firt-year education students. The Secretary of the Joint Matriculation Board (le Roux, 1976) warned that the reliability of the matriculation examination

for predicting success at university is questionable. Good symbols in the matriculation examination could be the result of cramming, spoon-feedir and excessive coaching. The need to assimilate, synthesize and evaluate are not fully met at schools. University requirements and methods are different.

This investigation also revealed that students from poorer socio-economic backgrounds performed better in the matriculation than those students from higher socio-economic backgrounds.

6.1.6.2 Scholastic Aptitude

The scholastic aptitude scores of the sub-groups are about the same.

The correlations between scholastic aptitude and academic performance are low for all groups. These correlations are much smaller than those obtaine in the United States studies, but are similar to those obtained in similar researches in South Africa and Great Britain. The low correlations are probably due to the relatively narrow range in the scholastic aptitude scores, as those proceeding to university are a selected group (Brandford, 1961, 49; Lavin, 1965, 51; Downie and Heath, 1970).

Therefore, these low correlations do not necessarily imply that scholastic aptitude is unimportant for success at university.

While there is little difference between the scholastic aptitude scores of the Diploma and B.Paed. groups, the former have done significantly better in their first year examinations at university. Explanations for this may be found from, *inter alia*, the superior student-lecturer ratio in the Faculty of Education; the superior socio-economic background of the Diploma group; the greater interest towards teaching displayed by the Diploma group; the differences in the nature of the courses taken by the two groups.

6.1.6.3 Extraversion

The extraversion scores for the different groups are about the same. The mean score for extraversion is similar to those obtained by other researchers in South Africa and overseas.

This study has disclosed that a significant correlation exists between extraversion and academic performance for the Diploma group, indicating that in this group the extraverts are better scholars than the introverts. This finding is similar to that of Mehryar *et al* (1973) in the Middle East but contrary to most Western findings which showed up the introvert as the better university student.

This investigation also revealed that

(a) the extraverts belong to a high socio-economic level than the introverts, and are less neurotic than the introverts,

(b) extraverts come from homes run more democratically than homes of the introverts and

(c) extraverts reveal greater scholastic aptitude than introverts.

6.1.6.4 Neuroticism

The mean neuroticism scores among the various groups show little difference. The neuroticism scores obtained in this study are similar to those obtained in researches in South Africa and overseas.

Neuroticism does not affect the academic performance of students in this study. This result is similar to findings by Orpen (1970) in South Africa and some resarchers in Great Britain.

This study also revealed

(a) that greater neuroticism prevails in homes with

better-educated mothers,

(b) that female students possess greater neuroticism than male students and

(c) neuroticism is more prevalent in autocratic homes than in democratic homes.

6.1.6.5 Teacher-Oriented Interests

This study revealed that the B.Paed group is less interested in teaching as a career than the Diploma group. The former are also less prominent in scientific and literary interests than the Diploma and are thus possibly less suited to a teacher-education programme. This may be one of the reasons for the better academic performance of the Diploma group. Restrictions in occupational choice and the attraction of bursaries may be instrumental in the B.Paed group's decision to study as teachers.

6.1.6.6 Commuter Time

The commuter times were about the same for all groups. But commuter-time correlated significantly and negatively with academic performance for the B.Paed group. Those that took longer to travel to university did worse in the examinations. The reasons might include their inability to meet the demands made on them in terms of assignments, reading, self-help, etc.

This research also revealed that

(a) students from the poorer sections of the community took longer to commute, possibly because they rely heavily on public transport which has never been really satisfactory;

(b) female students took less time to travel to university than male students; this is probably due to the fact

that females have a better socio-economic background than the males and can afford superior transport facilities.

6.1.6.7 Father's Education and Occupation

The educational and occupational levels of the fathers are generally low. The educational levels of the fathers are appreciably higher than those of the mothers. The fathers of the SP group are the best-educated and there is a significant difference between the educational levels of the SP fathers and the JS fathers. The SP fathers have the highest mean occupational level but there is no significant difference in the occupational levels of the different groups.

Father's education is not important in this study as a factor affecting academic success at university. However, father's occupation correlates significantly and positively with academic performance for the Diploma group. This indicates that better-achieving students have fathers in higher occupational levels.

If father's occupation is accepted as an index for social class then sociological determinants play important roles in the academic performance of education students in the University of Durban-Westville. Achievement is higher in a better-ordered society (Cattell and Butcher, 1968, 218). A national policy of full development of talent, regardless of race or class, is necessary to ameliorate this problem.

This investigation has revealed

(a) students with better-educated fathers generally have better-educated mothers;

(b) the occupational levels of the fathers are

compatible with their educational levels;

(c) female students have better-educated fathers than male students.

6.1.6.8 Mother's Education and Occupation

The educational levels of the mothers of Education students are generally low. The mothers of the SP group are the best-educated and their educational level is significantly higher than that of the JS mothers.

Mother's education correlates significantly with academic performance for the SP group. For this group the better-educated mothers have lower-achieving students at university. It must be remembered that better-educated mothers also had lower-achieving students in the matriculation examination. These findings are both surprising and alarming and are contrary to most findings elsewhere. In this investigation the better-educated mother is associated with greater neuroticism in her off-spring and greater neuroticism, in turn, is related to low achievement both at high school and university.

It is possible that the better-educated Indian mother, strongly aware of the value of high educational qualifications, is exerting too much pressure on her son or daughter to succeed academically. However, there is an optima level of demand on the student by the parents, and especially the mother, and if the student is pushed too hard or if he is over-protected, his achievement suffers.

The research has revealed that female students come from homes with better-educated mothers. Although most Indian mothers were educated, very few were in employment. By tradition the Indian mother stays at home.

6.1.6.9 Study Facilities

The scores for study facilities amongst the different groups show little

variation. They correlated significantly with academic performance (at university) for Diploma students. Superior study facilities are associated with superior university attainment.

This research has also shown

(a) low career aspirations negate the advantages of superior study facilities;

(b) female students have superior study facilities at home, which is not surprising when it is recalled that females come from higher socio-economic levels than males.

6.1.6.10 Home Regime

Home regime mean scores are about the same for all groups but home regime is not an important factor for the academic success of students at university.

6.1.6.11 Part-Time Commitments

This factor correlates significantly with academic performance for the SP group and indicates that SP students who work part-time during the academic year find that their jobs interfere with their studies.

The percentage of students working part-time was 38,06. The group most involv in part-time work was the SP (45,7%) although the SP group has a better socio-economic background than the other groups.

The students from the higher social strata are more involved in part-time work. Many of them do not hold bursaries. It is also possible that some of the working students have learnt from their parents to appreciate the need for hard work and economy as this results in better living.

On the other hand, students from poorer homes, having persisted against

handicaps in primary and high schools, are probably continuing their struggle into university ignoring the temptation of remuneration from part-time work. Besides, indigent students have performed better in the matriculation examination and thus hold more bursaries which, reduces the need for part-time involvement.

This research also revealed that more males are involved in part-time work than females.

6.1.6.12 Age

The mean ages of the different groups are about the same. Age has little influence on academic performance.

6.1.6.13 Sex

The ratio of male to female in this study was 1 : 1. Sex correlated significantly with academic performance for the Diploma group. Male students performed better academically than female students. This is contrary to most research findings in other countries and cultures, where women have a longer history of formal education.

It is encouraging to note the growth in the number of women entering institutions of higher learning. This is an indication that the Indian community is moving away from the differentiation of male and female roles which have characterized it in the past. An increase in female teacher-trainees is a healthy sign for the profession as women can make valuable contributions to teaching, especially with infants and younger children where they are better suited than men.

6.1.6.14 Financial Aid

Bursars comprised just over 50% of the Total.

Financial aid correlated negatively with academic performance for all

groups. The correlation is significant for the Total group. This indicate that non-bursars perform better at university than bursars.

This is unexpected and a matter for concern. Academic merit (matriculation results) was the most important criterion considered when bursaries were awarded. However, it has already been shown that the predictive value of matriculation results for university success is questionable. Other possible reasons for the poor performance of the bursars are: Students committed to a course (like the bursars) achieve less than uncommitted students (Sugarman, 1968); the need for financial assistance decreases academic aspiration (Dixon, *et al*, 1972); financial assistance results in lower independent study involvement (Winder, 1972); over-achievers have interests related to high prestige occupations (Lavin, 1965, 77) and it is unlikely that most bursars regard teaching as a prestigious occupation.

It is obvious that all the issues surrounding the award of bursaries need to be thoroughly investigated.

6.1.6.15 Residence

The number of students living in the university residences was too small (16 out of 134) to warrant the making of inferences.

6.1.6.16 Teacher-Career Aspirations

The differences between the mean scores of the different groups for teacher-career aspirations are small.

Correlation coefficients between career aspiration and academic performance are positive for all groups and this suggests that superior achievement is associated with higher aspirations. This investigation has revealed that students from the poorer socio-economic levels showed higher aspirations for teaching as a career.

6.2 RECOMMENDATIONS

6.2.1 Additional Research

6.2.1.1 A Complementary Experimental Design

Further research into the academic performance of students in the Faculty of Education is advocated. This study employed a static design. An investigation, complementary to the present one but employing a longitudinal design, is recommended. This design requires taking the total first-year enrolment of one or more years and carefully scrutinizing the students' progress during their stay at university (year by year) and their final achievement. Longitudinal designs are valuable for investigating feed-back and interdependent relationships.

6.2.1.2 Institutional Factors

This study concerned itself primarily with student factors. It is recommended that a research be conducted into institutional factors like administration, instruction and examination, to ascertain the extent to which they affect academic achievement (van Wyk de Vries, *et al*, 1974, 278). Course arrangements and structure, qualifications of staff, staff-student ratio, staff-student relationships are some of the variables that need to be studied. The desirability of the semester system should also be investigated.

6.2.1.3 Departmental Research

Since many of our students study in other Faculties and since others come into the Education Faculty after having spent some time in other Faculties, it is recommended that these Faculties undertake research similar to the present one to study determinants of performance within curricular groupings. With enrolment increasing every year, the educability of students — who vary widely in ability, aptitude, motives and disposition —

becomes more and more important (The Robbins report, 1963).

6.2.2 Screening Procedures

6.2.2.1 The Matriculation Examination as a Predictor

This research has shown that the matriculation examination is not a reliable predictor of success for first-year education students. It is recommended, therefore, that the present selection procedures be revised and augmented. In addition to the matriculation results, scholastic aptitude tests, both objective and essay type, assessing general knowledge and abilities and the power for independent creative thinking, should be compiled, standardised and administered. Shortcomings in the predictive ability of the matriculation examination have already led Great Britain, Australia and other countries to consider seriously the introduction of scholastic aptitude tests for first-year applicants to university.

6.2.2.2 Reports by High-School Principals and Counsellors

Further, reports on students from their high schools should also be considered when students are being selected. Information from counsellors, both at high school and at university, should be used to augment selection procedures. Closer liaison between guidance and counselling services at high school and at university is suggested so that more first-year university students can make realistic decisions and choose fields of study appropriate to their interests, attitudes, vocational aims and ability. It has been demonstrated overseas that counselling facilitates higher achievement. Our students are undoubtedly career-conscious but greater professional guidance on choice of careers and planning of courses is necessary.

6.2.3 Bursaries and Other Incentives

This research has shown that non-bursars generally achieve better

academically than bursars. Students from poorer socio-economic backgrounds were found to have higher aspirations for teaching, and high aspiration was found to be related to high achievement. It is recommended that other criteria besides matriculation symbols be considered when bursaries are awarded and that students of high ability from low income families be given first consideration.

At present, the student has to pay back the bursary if he fails and the worry over the rising debt causes a feeling of insecurity. This anxiety can result in under-achievement (Blanchfield, 1971, 1). Proper selection of students is vital.

Commuter time significantly affected the performance of the under-graduate first-year students in this study. Travelling by bus for non-whites is a major problem which not only taxes the income of the lower paid but also adds a disproportionate amount of time to a normal day (Coetzee, 1975). It is recommended therefore that a subsidised direct bus service be provided from the University to the urban townships like Merebank, Chatsworth and Phoenix.

6.2.4 Broader Educational and Social Issues

6.2.4.1 Counselling of Parents, Especially the Educated Mother

It has been shown that students are choosing careers incompatible with their interests. The literature has also revealed that parents are partly responsible for the careers chosen by their off-spring. It is recommended that counsellors at university and particularly at schools, impress upon parents the necessity for choosing careers that can be reconciled with the abilities, interests and aptitudes of the students.

The anomaly of the educated Indian mother is a matter of concern. While better-educated fathers generally have higher achieving off-spring at

university, the situation is reversed for the better-educated mother. This shortcoming can be tackled at school level by counsellors who could prevail upon the mother the need for an optimal level of demand on the student, as over-demand or over-protection reduces achievement both at high school and university.

6.2.4.2

The appointment of a Dean of students, who can also be the Director of the University Guidance and Counselling Centre, could help considerably in the early identification and amelioration of student problems.

6.2.4.3 Encouragement of More Females to Enter Teaching

As noted earlier the ratio of males to females in this study is 1 : 1. In the past, teaching in the Indian schools has been dominated by males. The indications are that more women are now entering the profession. It is recommended that encouragement should be given to more suitably qualified girls to train as teachers so that they can take proper care of infants and younger children at schools since women are regarded as more suitable for teaching pupils in this age range.

6.2.4.4. Occupational Restrictions and Employer Discrimination

Restrictions in occupational choice are forcing many students unsuited to teaching to enter the profession and this is obviously undesirable. It is strongly urged that all vocations and professions be made available to Indians.

Employer prejudice is another obstacle to employment in commerce and industry. Greyling (1977) has forecast that not all University of Durban-Westville graduates will find employment in the commercial and industrial sectors. As a result many may want to turn to teaching; but their suitability will be open to question. This prejudice against the Indians must be tackled on all fronts.

BIBLIOGRAPHY

A. BOOKS, PERIODICALS AND UNPUBLISHED MATERIAL

AL-BASSAM, I.A. (1973) : *"A Study of Selected Factors Contributi to Students' Failure at Freshman Level at Riyadh University".* Unpublished Doctoral Dissertation, Michigan State University.

ALLPORT, G.W. (1937) : *Personality: A Psychological Interpretation.* H. Holt and Co., New York.

ANDRULIS, R.S. (1968) : "Prediction of Scholastic Success in th University of Texas Law School". *Dissertation Abstracts*, Vol. 29, p. 177

ANTHONY, W.S. (1973) : "The Development of Extraversion, Abili and of the relation between them". *The British Journal of Educational Psychology*, Vol. 43, Part 3.

ASTIN, A.W. (1971) : *Predicting Academic Performance in College.* The Free Press, New York.

BAARD, A.D. (1956) : *Die Aanpassing en Intelligensie van die Eerstejaar.* Unpublished M.A. Dissertation, University of Stellenbosch.

BANKS, O. & FINLAYSON, D. (1973) : *Success and Failure in the Secondary School.* Methuen and Co. Ltd., London.

BAY, C. (1962) : "A Social Theory of Higher Education". In N. Sandford (ed.): *The American College:A Psychological and Social Interpretation of the Higher Learning.* John Wiley and Sons, Inc., New York.

BEARDSLEE, D.C. & O'DOWD, D.D. (1962) : "Students and the Occupational World". In N. Sandford (ed.): *The American College:A Psychological and Social Interpretation of the Higher Learning.* John Wiley and Sons, Inc., New York.

BEHR, A.L. (1975) : *Psychology and the School.* Butterworths, Durban.

BEHR, A.L. (1977) : *A Textbook of Educational Method.* J.L. van Schaik, Pretoria.

BEHR, D. (1972) : "A Study of the Occupational Preferences and Values of a Group of First-Year Indian Students at the University College Durban, now known as the University of Durban-Westville". *Journal of the University of Durban-Westville*, Vol. 1, No. 2.

BEHR, D. (1974) : "E P I Scores of a Group of Indian Students at the University of Durban-Westville". *Journal of the University of Durban-Westville*, Vol. 2, No. 2.

BEHR, D. & BEHR, A.L. (1965) : "An Investigation into the Proficiency and Background Factors likely to Affect Performance of a Group of First-Year Students at the University College, Durban ". *Journal of the University College, Durban*, Vol. 1, No. 1.

BEHR, A.L. & MacMILLAN, R.G. (1966) : *Education in South Africa.* J.L. van Schaik, Pretoria.

BERENT, S., ERICKSON, R.R. & WEST, S.L. (1977) : *Introductory Psychology.* McGraw - Hill, New York.

BERG, A.S. (1973) : "Selected Factors of Dropout and Non-Dropout Freshman under Open Admissions at Queens College, Cuny". *Dissertation Abstracts*, Vol. 34 p. 2188A.

BEYER, D.E. (1971) : "An Analysis of Selected Intellectual and Non-Intellectual Characteristics of Drop-Outs and Survivors in a Private College". *Dissertation Abstracts*, Vol. 32, p. 3773A

BLACK, H.P. (1965) : "The Predictive Value of Selected Factors for Achievement of Lee College Freshman". *Dissertation Abstracts*, Vol. 29, p. 618A.

BLANCHFIELD, W.C. (1971) : "College Dropout and Identification; a Case Study". *The Journal of Experimental Education*, Vol. 40, No. 2.

BLOOM, B.S. & PETERS, F.R. (1961) : *The Use of Academic Prediction Scales for Counselling and Selecting College Entrants.* The Free Press, New York.

BOISE, J.D. (1973) : "The Relationship between certain Characteristics of Students and their Hig Schools With Academic Success in a Colleg of Education". *Dissertation Abstracts*, Vol. 35, p. 738A.

BOONE, (JR) J.L. (1966) : *The Relationship between Selected High School Subjects and Achievement by Engineering Students.* Unpublished Doctoral Dissertation; A and M University, Texas.

BOOYENS, J., ALLSOP, V.M., NAIDOO, P.R., MAKAN, C.V., MANJOO, M. & CAMPBELL, G.D. (1973) : "The Nutritional, Somatometric and Socio-Economic Status of Twenty Chatswort Indian Households". *Journal of the University of Durban-Westville*, Vol. 2, No. 1.

BRANDFORD, W.R.G. (1961) : *Some Problems in the Selection and Preliminary Training of Non-European Medical Students.* Unpublished Ph. Dl Thesis, University of Natal.

BRAZIER, J.F. (1971) : "How Successful, Unsuccessful Students an Faculty Members see their College: A Multi-Variate Analysis of the Relationshi of Environmental Perceptions to Academic Performance". *Dissertation Abstracts*, Vol. 32, p. 3016A

BRITTON, R. (1972) : "Stability and Change of Education Freshman Personality Characteristics and Environmental Perceptions". *Dissertation Abstracts*, Vol. 34, p. 1094A.

BRODY, N. (1972) : *Personality, Research and Theory.* Academic Press, New York.

BROE, J.S. (1964) : "Failure Rates and Quotes: a note". *Vestes*, Vol. 7.

BROWN, D.R. (1962) : "Personality, College Environment and Academic Productivity". In N. Sandford (ed.): *The American College: A Psychological and Sociological Interpretation of the Higher Learning.* John Wiley and Sons, Inc., New York.

BROWN, F.G. & DU BOIS, T.E. (1964) : "Correlations of Academic Success for High Ability Freshmen". *Personnel and Guidance Journal*, Vol. XLII, No. 6.

BYLER, J.T. : "The Relative Influence of Selected Variables in determining the Level of Vocational Preference". *Dissertation Abstracts*, Vol. 27, p. 2385A.

CATTELL, R.B. & BUTCHER, H.J. (1968) : *The Prediction of Achievement and Creativity*. Bobbs-Merrill Co. Inc., Indianapolis/New York.

CAVENDER, C.A. (1974) : "A study of Selected Intellective and Non-Intellective Factors related to Achievement of Native American Freshmen at The University of Minnesota". *Dissertation Abstracts*, Vol. 35, p. 3326A.

CHOPRA, S.L. (1969) : "Cultural Deprivation and Academic Achievement". *The Journal of Educational Research*, Vol. 62, No. 10.

CLOSS, S.J. (1969) : "Occupational Interest Guide of the Applied Psychology Unit of Edinburgh University". University of London Press, London.

COCHRAN, J.A. (1974) : "A Descriptive Study of Examination Grades Reading Ability and Attrition of certain Low Income Freshmen at Arizona State University". *Dissertation Abstracts*, Vol. 35, No.4042A.

COOK, W.R. (1967) : "Factors Associated With the Occupational Choices of Young Men". *Dissertation Abstracts*, Vol. 28, p. 799A.

COWELL, M.D. & ENTWHISTLE, N.J. (1971) "The Relationship between Personality, Study Activities and Academic Performance in a Technical College". *The British Journal of Educational Psychology*, Vol. 41, Part 1.

CROUCH, J.G. (1968) : "The Role of Sex, Anxiety and Independence as Moderation Variables in Achievement of College Freshmen". *Dissertation Abstracts*, Vol. 29, p. 3827A.

DANIELS, M.G.M. (1970) : *The Screening of Students*. Prepared for Committee for Higher Education and Research of the Council of Europe. G.G. Harrap, London.

DAVIS, R.K. (1971) : "A Study of Factors Affecting Congruent and Incongruent College Choice among Highly Gifted Girls". *Dissertation Abstracts*, Vol. 32, p. 5543A.

DENHAM, E.C. (1966) : "The Prediction of College Success With Biographical Data and Self Ratings". *Dissertation Abstracts*, Vol. 27, p. 599A.

DE VECCHIO, R.C. (1971) : "Scholastic Aptitudes, Academic Motivation Personality and Biographical Characteristics of Returning and Non-Returning Community College Freshmen". *Dissertation Abstracts*, Vol. 32, p. 4371A.

DIXON, P.W., FUKUDA, N.K. & IGNACIO, R. (1972) : "Prediction of Post - High School Distination Choice from Curriculum, Financial Need and Students' Rating of Parents' Wishes for Post - High School Occupation". *The Journal of Experimental Education*, Vol. 41, No. 2.

DOUGLAS J.W.B. (1964) : *The Home and the School* MacGibbon and Kee, London.

DOWNIE, N.M. & HEATH, R.W. (1970) : *Basic Statistical Methods.* (Third Edition). Harper and Row, New York.

DU BOIS, P.H. (1957) : *Multivariate Correlational Analysis.* Harper and Bros., New York.

DURIG, K.D. (1967) : "A Study of Social Status and Occupational Choice among High-School Students". *Dissertation Abstracts*, Vol. 28, p. 3777A.

EDWARDS, A.L. (1967) : *Statistical Methods for the Behavioural Sciences.* (Second Edition). Holt Rinehart and Winston, New York.

ELDER, G.H. (1965) : "Family Structure and Educational Attainment: A Cross - National Analysis". *American Sociological Review*, Vol. 30, No.1

ENNIS, R.E. (1973) : "Selected Personality Variables Related to Three Levels of Academic Achievement of Freshmen in Two-Year Colleges". *Dissertation Abstracts*, Vol. 34, p. 3134A.

ENTWHISTLE, N.J. & BRENNIN, T. (1971) : "The Academic Performance of Students : Two types of Successful Students". *The British Journal of Educational Psychology*, Vol. 41, Part 3.

ENTWHISTLE, N.J. & ENTWHISTLE, D. (1970) : "The Relationships between Personality, Study Methods and Academic Performance". *The British Journal of Educational Psychology*, Vol. 40, Part 1.

EYSENCK, H.J. (1947) : "Student Selection". *The British Journal of Educational Psychology*, Vol. 17.

EYSENCK, H.J. & EYSENCK, S.B.G. (1970) : *Manual of the Eysenck Personality Inventory*. University of London Press, London.

FARLEY, F.N. (1971) : "Some EPI Reliability Estimates". *Journal of Personality Assessment*, Vol. 35.

FARNSWORTH, D.S., FUNKENSTEIN, D. & WEDGE, B.A. (1962) : "A Study of Social and Emotional Adjustment of Early Admission College Students". In N. Sandford (ed.): *The American College: A Psychological and Sociological Interpretation of the Higher Learning*. John Wiley & Sons, Inc., New York.

FEAGINS, W. (1968) : "Wastage in British Universities". *Educational Research*, Vol. 11, No. 1.

FISHER, R.P. (1952) : "Signed versus unsigned personal questionnaires". *Journal of Applied Psychology*, Vol. 5.

FISHMAN, J.A. (1962) : "Some Social - Psychological Theory for Selecting and Guiding College Students". In N. Sandford (ed.): *The American College : A Psychological and Sociological Interpretation of the Higher Learning*. John Wiley and Sons, Inc., New York.

FISHMAN, J.A. & PASANELLA, A.K. (1962) : "Admission - Selection Studies", cited in N. Sandford (ed.) : *The American College: A Psychological and Sociological Interpretation of the Higher Learning*. John Wiley and Sons, Inc., New York.

FLECKER, R. (1959) : "Characteristics of Passing and Failing Students in the First-Year University Mathematics". The Educand, Vol. 3, No. 3.

FLOOK, A.J.M. & SAGGAR, V. (1968) "Academic Performance with and without Knowledge of Scores on tests of Intelligence, Aptitude and Personality". *Journal of Educational Psychology*, Vol. 59, No. 6.

FORREST, D.V. (1967) : "High-School Underachievers at College". *The Journal of Educational Research*, Vol. 61, No. 4.

FORSTER, M. (1959) : *An Audit of Academic Performance*. Queens University, Belfast.

FREEMAN, F.S. (1960) : *Theory and Practice of PSYCHOLOGICAL TESTING*. Holt Rinehart and Winston, Inc., New Yor

FURNEAUX, W.D. (1961) : *The Chosen Few : An Examination of Some Aspects of University Selection in Brita* Oxford University Press, London.

GAFFNEY, J.P. (1973) : "The Interrelationship of Scholastic Aptitude and Selected Personality Variables to Academic Achievement at the College Level". *Dissertation Abstracts*, Vol. 34, p. 4617

GARRETT, H.E. & WOODWORTH, R.S. (1964) : *Statistics in Psychology and Education*. D. McKay Co. Incorporated, New York.

GLASS, D.V. (1954) : *Social Mobility in Britain*. Routledge and Kegan Paul, London.

GLENN (SENIOR), H. (1971) : "Predicting Academic Achievement of 'special admit' Students at Pennsylvania State University". *Dissertation Abstracts*, Vol. 32, p. 2434

GOLDMAN, R.D. & HUDSON, D.J. (1973) : "A Multivariate Analysis of Academic Abilities and Strategies for Successful and Unsuccessful College Students in Different Major Fields". *Journal of Educational Psychology*, Vol. 65, No. 3.

GOLDMAN, R.D. & SLAUGHTER, R.E. (1976) : "Why College Grade Point Average is Difficult to Predict". *Journal of Educational Psychology*, Vol. 68, No. 1.

GOLDSTEIN, M.S. (1974) : "Academic Careers and Vocational Choices of élite and non-élite students at an élite College". *Sociology of Education*, Vol. 47, No. 4.

GOOD, C.V. (1963) : *Introduction to Educational Research*. Appleton Century Crofts, New York.

GOODENOUGH, F.L. (1960) : *Mental Testing: Its History, Principles and Applications*. Rinehart and Company Inc., New York.

GOUWS, D.J. (1957) : *"Die Akademiese Vordering en Aanpassing van Eerste-Jaar Universiteitstudente - 'n Statistiese - Kliniese Studie".* Unpublished P4.D. Thesis, Pretoria University.

GRAY, G.A. & SHORT, L.N. (1961) : "Student Progress in the University: University of New South Wales". *Sociology of Education*, Vol. 147, No. 4.

GUILFORD, J.P. (1954) : *Psychometric Methods.* McGraw - Hill, New York.

HALL, L.H. (1968) : "Selective Variables in the Achievement or Non-Achievement of Junior College Students from Different Socio-Economic Backgrounds". *Dissertation Abstracts*, Vol. 29, p. 1674.

HAMMOND, S.B. (1957) : *Draft Report on a First Year Student Survey, 1955 - 1956.* University of Melbourne Press, Melbourne

HARDING, C.P. (1974) : "An Analysis of the Power of Selected Variables Endogenous and Exogenous to the University in Predicting the Academi Achievement of Students at Illinois State University". *Dissertation Abstracts*, Vol. 35, p. 1460.

HARRIS, D. (1940) : "Factors Affecting College Grades: A Review of the Literature". *Psychology Bulletin*, Vol. 37.

HERRENKOHL, P.C. (1972) : "Factor - Analytic and Criterion Study of Achievement Orientation". *Journal of Educational Psychology*, Vol. 63, No. 4.

HERRIDGE, E.L. (1971) : "The Relationship of Selected Non-Intellectual Variables to Academic Achievement of Students at an Open Door Community College". *Dissertation Abstracts*, Vol. 32, p. 3689A

HIGGINS, E. (1970) : "Some Career Aspirations of a Sample of Full-time University College Students". *Journal of the University College, Durban*, Vol. 2, No. 1.

HILGARO, E.R., ATKINSON, R.S. & ATKINSON, R.L. (1975) : *Introductory Psychology.* H.B. Jovanovich, Inc., New York.

HIMMELWEIT, H. (1950) : "Student Selection - An Experimental Investigation". *British Journal of Sociology*, Vol. 1, No. 4.

HIMMELWEIT, H. & SUMMERFIELD, A. (1951) : "Student Selection - An Experimental Investigation : III". *British Journal of Sociology*, Vol. 2, No

HOLMES, P.L. (1968) : "Academic Achievement of Veterans in Junior College". *Dissertation Abstracts* Vol. 29, p. 2062A.

HONESS, T. & KLINE, P. (1974) : "Extraversion, Neuroticism and Academic Attainment in Uganda". *The British Jour of Educational Psychology*, Vol. 44.

HOPKINS, J., MALLESON, N.B. & SARNOFF, I. (1958) : "Some Non-Intellectual Correlates of Success and Failure among University Students". *British Journal of Education Psychology*, Vol. 28, Part 1.

HOPKINS, W. (1972) : "Measuring General Culture among Student Teachers". *Educational Research*, Vol. 14, No. 2.

HOUNTRAS, P.T. & BRANDT, K.R. (1970) : "Relation of Student Residence to Academ Performance". *The Journal of Educational Research*, Vol. 63, No. 8.

HUGHES, P.W. (1960) : "Academic Achievement at the University. An Analysis of Factors Related to Succes: University of Tasmania.

HUSEMOLLER, K.E. (1969) : "The Prediction of Freshmen Academic Success at Eastern New Mexico University, Rosewell, by means of Selected Demographic and Standardised Tests Data". *Dissertation Abstracts*, Vol. 30, p. 1467A

HUSEN, T. (1968) : "Ability, Opportunity and Career ". *Educational Research*, Vol. 10, No. 3.

IFFERT, R.E. (1957) : "Retention and Withdrawal of College Students". *U.S. Department of Health Education and Welfare Bulletin 1958 No 1".* Government Printing Office, Washington.

ILIFFE, A.H. (1968) : "The Foundation Year in the University of Keele". *The Sociological Review Monograph, No. 12*

JACKSON, D.N. & MESSICK, S. (1967) : *Problems in Human Assessment.* McGraw - Hill, New York.

JITHOO, S. (1975) : "Fission of the Hindu Joint - Family in Durban". *Journal of the University of Durban-Westville*, Vol. 2, No. 3.

JOHNSON, J.G. (1971) : "Personality Characteristics of Unsuccessful Student Teachers". *Dissertation Abstracts*, Vol. 32, p. 6837A.

KEARNEY, D.L. (1966) : "Selected Non-Intellective Factors as College Predictors of Academic Success in Junior College Intellectually Capable Students". *Dissertation Abstracts*, Vol. 27, p. 395A.

KEATS, J.A. (1971) : *An Introduction to Quantitative Psychology.* John Wiley and Sons, Inc., Adelaide.

KELLY, S.G. (1970) : *Teaching in the City.* Gill and MacMillan, Dublin.

KHAMMASH, S.B. (1974) : "A Predictive Study of Academic Performance in a Liberal Arts College". *Dissertation Abstracts*, Vol. 35, p. 217A.

KINSEY, M. (1972) : "Financial Assistance as a Significant Factor in the Educational Survival of Selected Black Students at Michigan State University". *Dissertation Abstracts*, Vol. 33, p. 4881A.

KINZER, N.C. (1971) : "Parental Dominance, Parental Education and College Plans of Son". *Dissertation Abstracts*, Vol. 32, p. 4127A.

KLEIBER, W.C. (1974) : "Academic Achievement and Aspects of Acculturation among Puerto Rican Male Community College Students". *Dissertation Abstracts*, Vol. 35, p. 2771A.

KLINE, P. & GALE, A. (1971) : "Extraversion, Neuroticism and Performance in a Psychology Examination". *The British Journal of Educational Psychology*, Vol. 41, Part 2.

KNIGHT, H.V. (1968) : "A Multi-Variate Analysis of Academic Achievement among Freshmen Financial Aid Recipients enrolled at Selected Louisiana Colleges, 1964 - 1966". *Dissertations Abstracts*, Vol. 29, p. 2928A.

LANGLEY, D. (1965) : "Students Performance and Students Residence". *The Australian University* Vol 3, No. 2,

LAVIN, D.E. (1965) : *The Prediction of Academic Performance.* John Wiley and Sons, Inc., New York.

LAWRY, N.D. (1973) : "A Comparative Analysis of Selected Personality and Academic Characteristics of Community College Graduates and Dropouts". *Dissertation Abstracts,* Vol. 35, p. 2336A.

LEWIS, L. (1966) : "A Multi-Variate Analysis of Variables Associated with Academic Success within a College Environment". *Dissertation Abstracts,* Vol. 27, p. 4134A.

LISPET, S.M. & BENDIX, R. (1959) : "Social Mobility in Industrial Society", cited in N. Sandford (ed.) : *The American College: A Psychological and Sociological Interpretation of the Higher Learning.* John Wiley and Sons, Inc., New York.

LOVELL, K. & LAWSON, K.S. (1970) : *Understanding Educational Research.* University of London Press, London.

LOWE, J.D. & HILDMAN, L.K. (1970) : "E.P.I. Scores as a Function of Race". *British Journal of Social Clinical Psychology,* Vol. 11.

MACK, D.E. (1974) : "The Power Relationship in Black families and White families". *Journal of Personality and Social Psychology,* Vol. 30, No. 3.

MAHARAJ, S.R. (1968) : "A Summary of an Investigation into the Study Habits of Indian pupils in Standard 9 and 10 at Indian High-Schools in Natal with a view to recommending more approved methods of study". *Journal of the University College, Durban,* Vol. 1. No. 3.

MALHERBE, E.G. (1938) : "Whither Matric?" *South African Journal of Science,* Vol. XXXV.

MALHERBE E.G. (1977) : *Education in South Africa. Vol. 2.* Juta and Co., Cape Town.

MALLESON, N.B. (1959) : "University Student I Profile, 1953, A Study of One Year's Entry to University College London". *Universities Quarterly,* Vol. 13, No. 3.

MORRIS, D. (1964) : *"The Experience of Higher Education"*. Routledge and Kegan Paul, London.

MARSHALL, J.J. (1968) : "Non-cognitive variables as a Predictor of Academic Achievement among Freshmen, Sophomores and Juniors at Abillene College". *Dissertation Abstracts*, Vol. 29, p.3833A.

MARTRAY, C.R. (1971) : "An Empirical Investigation into the Learning Styles and Retention Patterns of Various Personality Types". *Dissertation Abstracts*, Vol. 32, p.5043A.

MAUGER, P.A. & KOLMODIN, C.A. (1975) "Long-term Predictive Validity of SAT". *Journal of Educational Psychology*, Vol. 67, No. 6.

MAZZONI (JUNIOR) J.L. (1971) : "The Relationship between Selected Variables and the Academic Performance of Arkansas students participating in the Federal College Work Study Programme". *Dissertation Abstracts*, Vol. 32, p.2356A.

McCALL, S.J. & THOMAS, D. (1974) : "Relationships between Selected Non-cognitive variables of certain Disadvantaged College Freshman and Academic Success". *Dissertation Abstracts*, Vol. 35, p.1983A.

McCAUSLAND, D.F. & STEWART, N.E. (1974) : "Academic Aptitude, Study Skills and Attitudes and College G.P.A". *The Journal of Educational Research*, Vol. 67, No. 8.

McCONNELL, T.R. & HEIST, P. (1962) : "The Diverse College Student Population". In N. Sandford (ed.): *The American College : A Psychological and Sociological Interpretation of the Higher Learning*. John Wiley and Sons, Inc., New York.

McCOOK, J.E. (1973) : "Predictors of Academic Success of Tennessee Community Junior College Transfer Students". *Dissertation Abstracts*, Vol. 34, p.4791A.

McLEISH, J. (1970) : *Student's Attitudes and College Environments* W. Heffer and Sons Ltd., Cambridge.

McMAHON, F.B. (1977) : *Psychology : The Hybrid Science*. Prentice Hall, New Jersey.

MEHRYAR, A.H. (1970) : "Some Data on the Persian translation of the E.P.I.". *British Journal of Social Clinical Psychology*, Vol. 9.

MEHRYAR, A.H., KHAJANI, F., RAZAVIEH, A. & HOSSEINI, A. (1973) : "Some Personality Correlates of Intelligence and Educational Attainment in Iran". *The British Journal of Educational Psychology*, Vol. 43, Part 1.

MELICHAR, D.W. (1973) : "A Study of the Comparative Academic Achievement of Selected employed and non-employed students at Arizonia State University". *Dissertation Abstracts*, Vol. 34, p. 3775A.

MERRIL, K.E. (1964) : The Relationship of certain Non-Intellectual factors to Lack of Persistence of Higher Ability Students at the University of California, Berkeley. *Dissertation Abstracts*, Vol. 25, p. 3439A.

MERRITT, J.E. (1974) : "Analysis of Academic Achievements, Biographical Characteristics, in relation to Persistence Descriptions of Selected Virginia Community College Students". *Dissertation Abstracts*, Vol. 35, p. 2592A.

MILLER, G.W. (1970) : *Success, Failure and Wastage in Higher Education*. George Harrap and Co. Ltd., London.

MITTANCK, R.G. (1974) : "The Relationship of selected Non-Cognitive variables to Academic Performance in Black College students". *Dissertation Abstracts*, Vol. 29, p. 3041A.

MULLER, A. (1965) : "Racial Distribution of Income in South Africa with special reference to Indians". *Journal of the University College, Durban*, Vol. 1, No. 1.

MULLER, A.L. (1964) : *Die Ekonomiese Posisie van die Asiaat in Suid-Afrika en enkele gebiede in Afrika*. Unpublished B. Com. Thesis, University of Stellenbosch.

NAIDOO, K.P. (1953) : *Post Primary Education for Indians in Natal; 1927 - 1952*. Unpublished M.Ed. Thesis, University of South Africa.

NAIDOO, M.B. & PERUMAL, M. (1976) : "Education and the Indian Community". Special Education Issue of *Fiat Lux*: A monthly Journal published by the Department of Information on behalf of the Department of Indian Affairs, Vol. II, No.3.

NEL, N.J. (1976) : "University Education". Special Education Issue of *Fiat Lux:* A monthly Journal published by the Department of Information on behalf of the Department of Indian Affairs, Vol. II, No. 3.

NEWCOMB, T.M. (1952) : "Student Peer Group Influence". In N. Sandford (ed.): *The American College: A Psychological and Sociological Interpretation of the Higher Learning.* John Wiley and Sons, Inc., New York.

NUTTALL, D.L., BACKHOUSE, J.K. & WILLMOT, A.S. (1974) : *Comparability of Standards between Subjects.* Evan Bros., London.

NUTTALL, D.L. & WILLMOT, A.S. (1972) : *British Examinations : Techniques and Analysis.* NFER, Berkshire.

OLSEN, F.J. (1957) : Failure in First-Year University Examinations. *Australian Journal of Education,* Vol. 1, No. 3.

ORPEN, C. (1970) : "Factors in University Success: An Empirical Investigation at the University of Cape Town". *Education Bulletin.* Vol. XV, No. 4.

OXTOBY, R. (1967) : "Reform and Resistence in Higher Education; A Critique of Current Research". *Educational Research,* Vol. 10, No. 1.

PACKARD, W.T. (1973) : "Motivation and Junior College Achievement". *The Journal of Educational Research,* Vol. 66, No. 7.

PARKYN, G.W. (1959) : *Success and Failure at University 1 : Academic Success and Entrance Standards.* New Zealand Council for Educational Research, Wellington.

PARRILLO, V.N. (1971) : "Predicting Academic Success in College Disadvantaged Students". *Dissertation Abstracts,* Vol.32, p.3457A.

PEARSON, F.A. & BENNETT, K.R. (1942) : *Statistical Methods.* John Wiley and Sons, Inc., New York.

PHILLIPS, L.W. (1968) : "Occupational Choice and Vocational Interest". *The Journal of Educational Research*, Vol. 61, NO. 8.

PILLAY, M.G. & NAGURAN, C.A. (1976) : "A Decade of Growth and Progress". Special Education Issue of *Fiat Lux* : A monthly Journal published by the Department of Information on behalf of the Department of Indian Affairs, Vol. II, No. 3, May/June, 1976.

PRICER, R.S. (1973) : "A Study of Student Attitudes and other Descriptive Variables as Predictors of Academic Achievement". *Dissertation Abstracts*, Vol.34, p.4759A.

PRIESTLEY, R.R. (1959) : "The Mental Health of University Students". In E.L. French (ed.). *Melbourne Studies in Education*, University of Melbourne Press, Melbourne.

PRUSOK, R.E. & WALSH, W.B. (1964) : "College Students' Residence and Academic Achievement". *Journal of College Student Personnel*, Vol. 5.

RAGO, J.J. (1969) : "The Influence of Undergraduate Residence Upon Students' Personal Development". *Dissertation Abstracts*, Vol. 30, p.3798A.

REUNING, H. (1957) : "Pauli Test Profiles of a group of Medical Students in relation to their IQ's and First-Year Results". Cited in Brandford W.R.G.: *Some Problems in the Selection and Preliminary Training of Non-European Medical Students*. Unpublished Ph.D Thesis, University of Natal, 1961.

RIMMER, J.D. (1973) : "The Association between Selected Social Academic and Genetic Variables and College Student Psychiatric Illness". *Dissertation Abstracts*, Vol. 34, p.6112A.

ROBERTS, L.H. (1967) : "A Study of Vocational Choices: An Analysis of Relationships between Certain Background factors and the Realism of Expressed Occupational Preferences of high school Seniors". *Dissertation Abstracts*, Vol. 28, p.2361.

ROE, A. (1953) : *The Making of a Scientist*. Dodd, Mead; New York.

RUSS, J.E. (1973) : "Relationship between Ability, Family Income and Amount of Financial Aid received by Students and their Persistence in College". *Dissertation Abstracts*, Vol. 34, p.4136A.

RYAN, J.D. (1969) : "A Comparison of Academic Achievement of Adult and College - Age Junior College Full-Time day Students". *Dissertation Abstracts*, Vol. 32, p.6816A.

SANDERS, C. (1963) : "Australian Universities and their Educational Problems". *The Australian University*, Vol. 1, No. 2, 1963.

SANDFORD, N. (EDITOR) (1962) : *The American College: A Psychological and Sociological Interpretation of the Higher Learning*. John Wiley and Sons, Inc., New York.

SCHOFIELD, H. (1972) : *Assessment and Testing: An Introduction*. George Allen and Unwin Ltd., London.

SCHONELL, SIR F.J., ROE, E. & MEDDLETON, I.G. (1962) : *Promise and Performance - A Study of Student Progress at University Level*. University of Queensburgh and University of London.

SCHWARZWELLER, H.K. & LYSON, T.A. (1974) : "Social Class, Parental Interest and the Educational Plans of American and Norwegian Youth". *Sociology of Education*, Vol. 47, No. 4.

SIDOWSKI, B.S. (1966) : *Experimental methods and Instrumentations in Psychology*. McGraw - Hill, New York.

SIMON, J.G. & FEATHER, N.T. (1973) : "Causal attributions for Success and Failure at University Examinations". *Journal of Educational Psychology*, Vol. 64, No. 1.

SINHA, D. (1966) : "A Psychological Analysis of some factors associated with Success and Failure in University Education". *Indian Educational Review*, Vol. 1, No. 1.

SLACK, B.D. & COOK, J.O. (1973) : "Authoritarian Behaviour in a Conflict Situation". *Journal of Personality and Social Psychology*, Vol. 25, No. 1.

SNYDER, F.A. (1971) : "Financial Assistance in Selected Pennsylvania Community Colleges and its Relationships to Persistence and Achievement". *Dissertation Abstracts*, Vol. 29, p.3041A.

SPECTOR, I.L. (1966) : "An Analysis of Certain Characteristics and the Educational Success of Junior College Freshmen". *Dissertation Abstracts*, Vol. 27, p.640A.

SPENCER, S.J.G. (1958) : "Academic Revoke and Failure among Oxford Undergraduates". *The Lancet* (Aug. 30, 1958).

SPIEGEL, M.R. (1972) : *Theory and Problems of Statistics*. (Schaum Outline Series). McGraw - Hill, New York.

SPRAGUE, D.S. (1969) : "A Comparative Study of Certain Intellectual and Non-Intellectual factors of University Freshmen based on Place of Residence". *Dissertation Abstracts*, Vol. 30, p.2387A.

STEEL, R.G.D. & TORRIE, J.H. (1960) : *Principles and Procedures of Statistics*. McGraw - Hill, New York.

STEYER, C.A. (1968) : "The Significance of various Life factors in Student Selection of Areas of Academic Interest". *Dissertation Abstracts*, Vol. 29, p.1739A.

STRODTBECK, F.L. (1965) : "Family Interaction, Values and Achievement". Cited in. LAVIN, D.E.: *The Prediction of Academic Performance*. John Wiley and Sons, Inc., New York.

STUTLER, D.L. (1973) : "The Interrelationship between Academic Achievement of College Freshmen Women and Measures of Anxiety and Ability". *Dissertation Abstracts*, Vol. 34, p.2400A.

SUDDARTH, B.M. (1957) : *Factors influencing the Successful Graduation of Freshmen who enrol at Purdue University*. Purdue University.

SUGARMAN, M.N. (1968) : "Commitment to Stated Vocational Choice as a factor in the Prediction of Academic Achievement among College Freshmen".
Dissertation Abstracts, Vol. 28, p.2900A.

SUGDEN, M.A. (1972) : "Chatsworth : Social and Economic Characteristics of the Population".
Journal of the University of Durban-Westville, Vol. 1, No. 2.

SUMMERSKILL, J. (1962) : "Dropouts from College". In N. Sandford (ed.): *The American College : A Psychological and Social Interpretation of the Higher Learning.*
John Wiley and Sons, Inc., New York.

SUMNER, R. (1974) : *Exploring Education. Looking at School Achievement.*
NFER, Berkshire.

SUMNER, R. & WARBURTON, F.W. (1972) : *Achievement in Secondary School. Attitudes Personality and School Success.*
NFER, Bershire.

TACONIS, L. (1969) : "The Role of the Contemporary Father in Rearing Young Children".
Educational Research, Vol. 11, No. 2.

THAYER, R.A. (1966) : "Occupational Interests and Socio-Economic Position of High School Boys".
Dissertation Abstracts, Vol. 27, p.1124A.

THOMAS, P.W. (1974) : "Academic Achievement of Second Semester Freshmen and its Relationship to Selected Aspects of the Background of the Students at the District of Columbia Teacher's College".
Dissertation Abstracts, Vol. 35, p. 1994A.

TIDGEWELL III J.F. (1972) : An Analysis of Intellectual and Non-Intellectual Variables relating to Predictability of Junior College students' Academic Progress".
Dissertation Abstracts, Vol. 34, p.2314A.

VEIT, H.R. (1966) : "An Analysis of the Parental Backgrounds of Selected Twelfth Grade Students who have indicated Teaching as a Career Choice".
Dissertation Abstracts, Vol. 27, p.989A.

VENABLES, E. (1963) : "Social Differences among Day-Release Students in relation to their Recruitment and Examination Success". *British Journal of Sociological and Clinical Psychology*, Vol. 2.

VERNON, P.E. (1963) : "The Pool of Ability". In P. Halmos (ed.): *The Sociological Review Monograph*, No. 9.

VERNON, P.E. (1965) : *Personality Tests and Assessments*. Methuen and Co. Ltd., London.

VISSER, J.C.P.N. (1968) : *'n Evaluering van die stelsel van voogdosente vir eerstejaarstudente aan die Potchefstroom Universiteit vir C.H.O.* Unpublished M.Ed. Thesis, Potchefstroom University for C.H.E.

WEINER, B. & POTEPAN, P.A. (1970) : "Personality characteristics and Affective reactions towards Examinations of Superior and Failing College Students". *Journal of Educational Psychology*, Vol. 61, No. 2.

WILSON, R.C. & WOODS, L. (1974) : "Social-psychological Accessibility and Faculty - student Interaction Beyond the Classroom". *Sociology of Education*, Vol. 47, No. 1.

WINDER, J.B. (1972) : "A Comparison of Certain Factors in Students With and Without Financial Aid at Austin College". *Dissertation Abstracts*, Vol. 33, p.4136A.

WORSELY, R.L. (1967) : "An Analysis of Selected Variables and the the Prediction of Educational Achievement of Junior College Freshmen". *Dissertation Abstracts*, Vol. 30, p.3705A.

WORTHINGTON, L.H. & GRANT, C.W. (1971) : "Factors of Academic Success : A Multivariate Analysis". *The Journal of Educational Research*, Vol. 65, No. 1.

B. MISCELLANEOUS PAPERS

"The Toils of a Commuter" (COETZEE, S.). *The Natal Daily News* — A registered daily newspaper, Durban. Oct. 8, 1976.

"Employment Opportunities for University - trained Indians" (GREYLING, J.J.C.). Institute for Social Research, University of Durban-Westville, 1977.

"A Study of the 1955 Entry into British Universities" (HOWELL, D.A.) Evidence to Robbins Committee *Report on Higher Education*, H.M.S.O., London 1963.

"Dropouts: Nature and Causes; Effects on Students, Family and Society" (IFFERT, R.E.). Association for Higher Educations, Current Issues in Higher Education, National Education Association, Washington, 1956.

"A Study of the Social Circumstances and Characteristics of the Bantu in the Durban Region: Report No 2". Institute for Social Research, University of Natal, 1963.

"Regte Prognose Steeds Ontwykend" (LE ROUX, W.H.). *Unisa News*, Newspaper of the University of South Africa, September, 1976.

"The Relationship of Entrance Age to Academic Success of University Students" (MALHERBE, E.G.). National Bureau of Educational and Social Research, Pretoria, 1937.

"High Failure Rate, Attendance and Testing" (OLIVIER, S.P.). Circular No.10/77 to all Heads of Departments and Staff. University of Durban-Westville, 1977.

"The Indian Domestic Budget. A Socio-economic Study of Incomes and Expenditures of Durban Indian Households" (PILLAY, P.N. and ELLISON, P.A.). Department of Economics, University of Natal, 1969.

Radio Talk (REDDY, J.N.). *"Saturday Mirror"* - A weekly magazine programme for Indians on the SABC English Service, 1976.

"Report on Higher Education" (THE ROBBINS COMMITTEE). H.M.S.O., London, 1963.

"Statistical Study of Transition from School to University" (STEYN, H.S.). Joint Matriculation Board, Pretoria, 1963.

Transvaal Education Bureau, cited in "Gifted Failures". *Times Educational Supplement*, Times Newspapers Ltd., London, Feb. 17, 1967.

"Enquiry into Student Progress" (UNIVERSITY GRANTS COMMITTEE). H.M.S.O., London, 1968.

"The Necessity for Research into University Teaching in the Changing Academic World" (VAN DER MERWE, B. DE V.). Unpublished manuscript of lecture delivered at symposium on University Teaching at Fort Hare University, 1973.

"Main Report of the Commission of Inquiry into Universities" (VAN WYK DE VRIES *et al*). Department of National Education. The Government Printer, Pretoria, 1974.

APPENDIX A

BIOGRAPHICAL AND SOCIOLOGICAL INVENTORY

1. (a) PURPOSE OF INVENTORY

This inventory is one of the instruments of an investigation into factors affecting the academic performance of first-yea students in the Faculty of Education. It is expected that t findings of this investigation will contribute to the formulation of theory and policy for the benefit of all concerned, particularly the student. It is therefore of the utmost importance that you answer as accurately as you can. The correctness of your replies will have a direct bearing o the validity of the inferences that are made from this study

The information you provide will be treated as STRICTLY CONFIDENTIAL.

Your co-operation will be greatly appreciated.

(b) HOW TO FILL INVENTORY

Where blocks are provided you are required in most cases to indicate your response with a cross (X) in the correspondi block. Elsewhere you must write in your answer. You will us a pencil. If you make a mistake or change your mind erase neatly before entering the correct response.

APPENDIX A (CONTINUED)

2. NAME: SURNAME : .....

GIVEN NAMES : .....

3. STUDENT REGISTRATION NUMBER: .....

4. AGE:

YEARS	MONTHS

5. RELIGION:

CHRISTIAN	HINDU	MOSLEM	OTHER (SPECIFY)

6. LINGUISTIC GROUP: (Not necessarily the language spoken at home)

GUJERATI	HINDI	TAMIL	TELUGU	URDU	OTHER (SPECIFY)

7. SEX:

MALE	FEMALE

8. NAME OF DEGREE/DIPLOMA ENROLLED FOR:

B. PAED.	U.D.E. JUN. SEC.	U.D.E. SEN. PRI.

APPENDIX A (CONTINUED)

9. NAMES OF COURSES/SUBJECTS YOU ARE TAKING THIS YEAR:

B. PAED.

(i)	Education I
(ii)	_____
(iii)	_____
(iv)	_____
(v)	_____

U.D.E.

(i)	Education
(ii)	English
(iii)	Afrikaans
(iv)	Physical, Health and Rec. Educ.
(v)	_____
(vi)	_____
(vii)	Practice Teaching

10. (a) PLACE OF RESIDENCE WHILE ATTENDING UNIVERSITY:

HOME	PRIVATE LODGINGS	UNIVERSITY RESIDENCE

(b) NAME OF DISTRICT OF RESIDENCE MENTIONED IN 10(a):

(Give exact locality, e.g. Unit 5 Chatsworth, Overport, Mount Edgecombe, Central Durban, Clairwood, Asherville, etc.)

.....

11. (a) MODE OF TRANSPORT:

(Not applicable to University Residence Students).

For the single journey to the University which of the following modes of transport do you use? (You may need more than one cross)

CAR	ONE BUS	TWO BUSES	TRAIN	FOOT

APPENDIX A (CONTINUED)

(b) DISTANCE FROM UNIVERSITY:

The distance (approx.) of the single journey to the University (in kilometres).

UNDER 5 km	BETWEEN 5 and 10 km	BETWEEN 10 and 20 km	OVER 20 km

(c) TIME TAKEN BY SINGLE JOURNEY TO UNIVERSITY (in minutes):

0 - 19	20 - 39	40 - 59	60 - 79	80 - 99	100 and over

12. PARENTS' EDUCATION:

	FATHER	MOTHER
No Education		
Junior Primary		
Senior Primary		
Junior Secondary		
Senior Secondary		
Post Matric (College)		
University Undergraduate		
University Graduate		

13. PARENTS' OCCUPATION:

If unemployed or retired give details of last occupation. If deceased give occupation when alive. If your mother is a housewife

APPENDIX A (CONTINUED)

and does not work state so.

PLEASE GIVE ENOUGH DETAILS TO MAKE OCCUPATIONAL DUTIES CLEAR:

FATHER: .....

.....

MOTHER: .....

.....

14. FINANCE:

(a) Do you hold a bursary?

YES	NO

(b) Are you a non-bursar with financial difficulties?

YES	NO

(c) If you have answered "YES" to 14(b) are your financial difficulties

MODERATE?	ACUTE?

15. STUDY FACILITIES:

(Not applicable to University residents).

(a) Is your place of residence a

COTTAGE?	FLAT?	SEMI-DETACHED UNIT?	OUTBUILDING?	BASEMENT?	OTHER (SPECIFY)

APPENDIX A (CONTINUED)

(b) Is this residence (15 (a))

OWNED BY YOUR PARENTS/GUARDIAN?	RENTED BY YOUR PARENTS/GUARDIAN?

(c) Does this residence have electricity?

YES	NO

(d) How many families live in the residence occupied by you?

ONE FAMILY	TWO FAMILIES	THREE OR MORE FAMILIES

(e) How many persons (including children) live with you?

SIX PERSONS OR LESS	SEVEN TO TEN PERSONS	MORE THAN TEN PERSONS

(f) How many persons share your room?

ONE PERSON OR LESS	TWO PERSONS	MORE THAN TWO PERSONS

(g) Are the study facilities (physical) at your residence

EXCELLENT?	GOOD?	SATISFACTORY?	POOR?	VERY POOR?

APPENDIX A (CONTINUED)

(h) Is the study environment (people at home, neighbours, vehicular traffic, etc.)

EXCELLENT?	GOOD?	SATISFACTORY?	POOR?	IMPOSSIBLE?

16. CAREER ASPIRATIONS:

(a) Was the decision to study further

YOURS ALONE?	YOUR PARENTS'/GUARDIAN'S ALONE?	A MUTUAL ONE?

(b) Is your career as a teacher

PERMANENT?	TEMPORARY?

(c) Is your career as a teacher

YOUR 1ST CHOICE?	2ND CHOICE?	3RD OR LATER CHOICE?	NOT YOUR OWN CHOICE

(d) With regard to teaching as a career are you

EXTREMELY HAPPY?	MODERATELY HAPPY?	HAPPY?	NEITHER HAPPY/UNHAPPY

APPENDIX A (CONTINUED)

17. HOME REGIME:

(a) Is the family relationship at home

HARMONIOUS?	STRAINED?

(b) Is the power relationship at home

DEMOCRATIC?	AUTOCRATIC

(c) Which parent has the greater degree of power?

MOTHER	FATHER	NEITHER (EQU

(d) In family decision-making regarding yourself is your degree of power

HIGH?	MODERATE?	LITTLE?	NONE

18. PART-TIME COMMITMENTS:

(a) Are you engaged in part-time work for remuneration

YES	NO

(b) If you have answered 'yes' to 18(a), is your part-time work for

A WHOLE WEEK? (MON. TO SAT.)	2 TO 3 WEEK DAYS ONLY? (EXCLUDING FRIDAYS)	FRI. & SAT. ONLY?	ONE DAY ONLY?

APPENDIX A (CONTINUED)

(c) Do you offer part-time help without remuneration?

YES	NO

(d) If you have answered 'yes' to 18(c) is the part-time help for

A WHOLE WEEK? (MON. TO SAT.)	2 TO 3 WEEK DAYS ONLY? (EXCLUDING FRIDAYS)	FRI. & SAT. ONLY?	ONE DAY ONLY?

APPENDIX B

STATISTICAL METHODS

APPENDIX B1

Ranks for the Psychological and Sociological variables obtained from responses of Staff of the Faculty of Education at the University of Durban-Westville

Members of staff of the Faculty of Education were given two sets of variables, one psychological and the other sociological (Chapter Two). They were asked to rank these numerically according to preference. The strongest weighting was to be given the numerical value 1.

The results were analysed by counting the number of respondents who put each given variable in the various ranks and a total rank score for each area was calculated. The procedure is set out in the following example in which the total rank score for one variable - i.e. high-school achievement is calculated.

	RANK 1	RANK 2	RANK 3	RANK 4	RANK 5	RANK 6	RANK 7	TOTAL
Number Replying	2	4	2	2	3	2	5	20
Weighted Rank	2x1	4x2	2x3	2x4	3x5	2x6	5x7	
	2 +	8 +	6 +	8 +	15 +	12 +	35	= 86

$$\text{Total Rank Score} = \frac{86}{20} = 4{,}3.$$

From the total rank score a rank position for the variable is obtained.

UNIVERSITY OF DURBAN LIBRARY

Details of the total rank scores for both psychological variables and sociological variables are given below:

PSYCHOLOGICAL VARIABLES

VARIABLE	TOTAL RANK SCORE	RANK POSITION
Scholastic Aptitude	1,9	1
Interest	4,15	2
High-School Achievement	4,3	3
Study Methods	4,7	4
Personality	5,05	5
Persistence	5,2	6
Academic Adjustment	5,3	7

SOCIOLOGICAL VARIABLES

VARIABLES	TOTAL RANK SCORE	RANK POSITION
Parent's Education	2,95	1
Family Income	3,5	2
Parent's Occupation	4,2	3
Family Conflict	4,45	4
Study Facilities	4,6	5
Career Aspirations	4,7	6
Type of Residence	4,85	7
Home Regime	4,9	8
Distance from University	5,25	9
Size of Family	6,7	10

(Kelly, 1970, 40)

APPENDIX B2

ANALYSIS OF VARIANCE

Testing the Difference between the Means of Two Groups with respective Scores X and Y

Required Data: (a) ΣX; $(\Sigma X)^2$; ΣX^2; N_X (N_X = Number of X Scores)

(b) ΣY; $(\Sigma Y)^2$; ΣY^2; N_Y (N_Y = Number of Y Scores)

Method:

1. Sums of squared deviations

(a) Total: $\frac{(\Sigma X^2 + \Sigma Y^2) - (\Sigma X + \Sigma Y)^2}{N_X + N_Y} = A(2044)$

(b) Between Groups: $\frac{\Sigma X^2}{N_X} + \frac{\Sigma Y^2}{N_Y} - \frac{(\Sigma X + \Sigma Y)^2}{N_X + N_Y} = B(246)$

(c) Within Groups: $A - B = C = (2064 - 246) = C(1798)$

2. Degrees of Freedom

(a) Total: $N_X + N_Y - 1 = D\ (91)$

(b) Between Groups: Number of groups - 1 = E (1)

(c) Within Groups: $(N_X - 1) + (N_Y - 1) = G\ (90)$

3. Variance

(a) Between Groups: $\frac{B}{E} = H\ (246)$

(b) Within Groups: $\frac{C}{G} = I\ (19,98)$

4. Variance Ratio (F)

$F = \frac{H}{I} = J\ (12,34)$

5. Significance : Consult F table.

The value of F needed for significance at the 1% level for 1 and 90 degrees of freedom is 6,93.

$$12,34 > 6,93$$

Therefore, the difference between the means is significant at the 1% level.

(Pearson and Bennett, 1942, 356)

APPENDIX B3

Ranks of Areas of Interests calculated from Responses of Staff Members of the Faculty of Education (See Chapter IV)

(See Appendix B1 for procedures employed to calculate total rank scores and rank positions).

INTEREST AREAS	TOTAL RANK SCORE	RANK POSITION
Social Science	2,32	1
Literary	2,61	2
Scientific	2,77	3
Practical	4,32	4
Artistic	4,45	5
Computational	5,03	6
Outdoor	6,52	7
Clerical/Sales	7,13	8

APPENDIX B4

The Phi Coefficient (Ø)

The formula for the phi-coefficient is

$$\emptyset = \frac{ad - bc}{\sqrt{k\ l\ m\ n}}$$

where the various letters are frequencies as shown in the table below which displays the results of 200 students in a statistics test.

	PASS	FAIL	
Males	60 a	40 b	100 k
Females	50 c	50 d	100 b
	110 m	90 n	200 N

$$\emptyset = \frac{60 \times 50 - 40 \times 50}{100 \times 100 \times 110 \times 90}$$

$$= 0,10$$

Significance can be established by using $X^2 = N\emptyset^2$ and then the X^2 tables (Downie and Heath, 1970, 236) or by consulting tables for gross r prepared by Snedecor (Steel and Torrie, 1960, 453).

For N = 200 the value for significance at 5% = 0,14 > 0,10.

Therefore the difference in performance between the males and females is not significant at the 5% level.

APPENDIX B5

The Partial Correlation Coefficients (Partial r): Interpretations and Computation

r_{12} is read as the gross correlation between variable one and variable two.

$r_{12.3}$ is read as the correlation (partial) between variable one and variable two with the effects of variable three partialed out/controlled.

$r_{12.34}$ is read as the correlation (partial) between variables one and two with the effects of variables three and four partialed out.

The general formula for partial r appears in Chapter Five.

The formulae for specific cases of partial r are given below:

$$r_{12.3} = \frac{r_{12} - (r_{13})(r_{23})}{\sqrt{(1-r^2_{13})\ (1 - r^2_{23})}}$$

$$r_{12.34} = \frac{r_{12.3} - (r_{14.3})\ (r_{24.3})}{\sqrt{(1 - r^2_{14.3})\ (1 - r^2_{24.3})}}$$

Example: We have the data in respect of the following three variables for a group of students.

1 = scores in maths test

2 = mass

3 = chronological age

If we want to compute the relation between the scores on the maths test (1) and mass (2), with the effect of chronological age (3) partialed out we must evaluate $r_{12.3}$.

We need $r_{12}(0,82)$; $r_{13}(0,77)$ and $r_{23}(0,80)$

$$r_{12.3} = \frac{0,82 - (0,77)(0,80)}{\sqrt{(1 - 0,77^2)(1 - 0,80^2)}}$$

(Spiegel, 1972, 278)

With an increase in the number of variables partialed out, the computation becomes more involved and the services of a programmable computer are necessary.

The partial correlation coefficients computed for this study by a Burroughs 5700 computer ran into several thousands. Therefore they are not reproduced here.

APPENDIX B6

Multiple Correlation Coefficients (R)

Interpretation and Computation

$R_{1.23}$ is read as the multiple correlation coefficient between variable one and variables two and three combined.

$R_{1.23}$ can also be interpreted as the combined effect of independent variables two and three on dependent variable one.

Similarly, $R_{1.234}$ is read as the combined effect of variables two, three and four on dependent variable one.

The general formula for Multiple R appears in Chapter Five.

The formula for specific cases appear below.

$$R_{1.23} = \sqrt{1 - (1 - r^2_{12})(1 - r^2_{13.2})}$$

$$R_{1.234} = \sqrt{1 - (1 - r^2_{12})(1 - r^2_{13.2})(1 - r^2_{14.23})}$$

Example: We use the problem situation for partial r (Appendix B5). Suppose we want to calculate the amount of relationship between scores on maths tests (1) and the other two variables mass (2) and age (3) combined. We must calculate $R_{1.23}$ and for this we need gross r_{12} (0,82) and partial $r_{13.2}$ (0,62).

$$R_{1.23} = \sqrt{1 - (1 - 0{,}82^2)(1 - 0{,}62^2)}$$

$$= 0{,}89$$

As the variables in the multiple correlation increase the computation takes more time and becomes more involved. In this investigation multiple correlation coefficients were calculated by a B5700 computer.

See Appendix D for coefficients of Multiple Correlation.

APPENDIX B7

Standard Deviation

$$\text{Standard Deviation (SD)} = \frac{1}{N}\sqrt{N\Sigma X^2 - (\Sigma X)^2}$$

where X is the score and N is the number of scores.

APPENDIX B8

Pearson Product-Moment Correlation Coefficient

The machine (Raw score) formula for the Pearson product-moment correlation coefficient is

$$r = \frac{N\Sigma XY - \Sigma X \Sigma Y}{\sqrt{[N\Sigma X^2 - (\Sigma X)^2][N\Sigma Y^2 - (\Sigma Y)^2]}}$$

where X and Y are pairs of scores and N the number of pairs.

(Spiegel, 1972, 245)

APPENDIX C

GROSS CORRELATION COEFFICIENTS

Appendix C contains tables of gross correlation coefficients between each factor studied and the remaining factors, excluding Interests.

APPENDIX C1

ACADEMIC PERFORMANCE

Appendix C1 shows the gross correlation coefficients between academic performance and the factors affecting it.

FACTORS CORRELATING WITH ACADEMIC PERFORMANCE	STUDENT GROUPS				
	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED.	TOTAL
Scholastic Aptitude	-0,029	0,079	0,033	-0,082	-0,013
High-School Achievement	-0,257	-0,080	-0,134	0,177	-0,303**
Extraversion	0,142	0,229	0,199	-0,031	0,140
Neuroticism	-0,191	-0,108	-0,138	0,088	-0,048
Commuter Time	-0,037	0,017	-0,003	-0,309*	-0,099
Father's Education	0,083	0,153	0,128	-0,062	0,048
Mother's Education	-0,140	0,124	0,047	-0,126	0,037
Parents' Education	-0,023	0,153	0,097	-0,098	0,049
Father's Occupation	0,022	0,281*	0,191	0,022	0,129
Study Facilities	0,075	0,208	0,171	-0,002	0,075
Home Regime	0,123	0,123	0,116	-0,083	0,030
Part-Time Commitments	0,267	-0,042	0,068	0,176	0,046
Age	-0,033	-0,076	-0,061	0,149	0,030
Sex	0,026	0,229	0,152	0,000	0,030
Financial Aid	-0,132	-0,075	-0,098	-0,020	-0,164
Residence	-0,031	0,123	0,057	0,085	0,029
Career Aspiration	0,125	0,119	0,122	-0,037	0,094

* - significant at 5%

** - significant at 1%

APPENDIX C2

S C H O L A S T I C A P T I T U D E

Appendix C2 shows the gross correlation coefficients between scholastic aptitude and the remaining factors.

FACTORS CORRELATING WITH SCHOLASTIC APTITUDE	STUDENT GROUPS				
	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B.PAED.	TOTAL
Academic Performance	0,029	0,079	0,033	-0,082	-0,013
High-School Achievement	0,246	0,015	0,114	0,125	0,096
Extraversion	0,334*	0,287*	0,294**	-0,016	0,191*
Neuroticism	-0,451	0,006	-0,197	0,173	-0,094
Commuter Time	0,144	0,145	0,150	0,155	0,150
Father's Education	-0,083	0,093	-0,029	0,029	-0,009
Mother's Education	-0,060	0,140	0,034	0,147	0,060
Parents' Education	-0,081	0,132	0,003	0,086	0,027
Father's Occupation	-0,176	-0,046	-0,121	0,062	-0,063
Study Facilities	0,175	-0,050	0,021	0,241	0,092
Home Regime	0,025	0,126	0,085	0,003	0,068
Part-Time Commitments	0,005	-0,139	-0,040	0,210	0,021
Age	0,046	-0,111	-0,042	-0,055	-0,046
Sex	0,029	0,123	0,174	0,000	0,090
Financial Aid	0,083	0,050	0,066	0,020	0,074
Residence	-0,169	0,133	0,000	0,043	0,029
Career Aspiration	-0,318	-0,054	-0,110	0,234	0,033

* - significant at 5%

** - significant at 1%

APPENDIX C3

H I G H - S C H O O L A C H I E V E M E N T

Appendix C3 shows the gross correlation coefficients between high-school achievement and the remaining factors.

FACTORS CORRELATING WITH HIGH-SCHOOL ACHIEVEMENT	STUDENT GROUPS				
	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B.PAED.	TOTAL
Academic Performance	-0,257	-0,080	-0,134	0,177	-0,303**
Scholastic Aptitude	0,246	0,015	0,114	0,125	0,096
Extraversion	0,024	-0,143	-0,085	-0,095	-0,134
Neuroticism	-0,284	-0,072	-0,144	-0,018	-0,076
Commuter Time	0,130	-0,070	0,004	-0,133	-0,059
Father's Education	-0,242	-0,202	-0,234*	-0,293	-0,201*
Mother's Education	-0,345*	-0,130	-0,212*	-0,018	-0,175*
Parent's Education	-0,326*	-0,182	-0,249*	-0,205	-0,212*
Father's Occupation	-0,152	-0,268*	-0,237*	-0,274	-0,215*
Study Facilities	-0,003	-0,061	-0,053	0,007	0,001
Home Regime	0,176	0,174	0,175	-0,173	0,091
Part-Time Commitments	0,232	0,026	0,122	-0,032	0,115
Age	-0,073	0,327*	0,186	-0,036	0,055
Sex	0,093	0,236	0,157	0,146	-0,030
Financial Aid	0,236	0,556**	0,370**	0,287	0,345**
Residence	-0,110	0,086	0,083	-0,108	-0,098
Career Aspiration	-0,097	-0,035	-0,083	0,048	-0,044

* - significant at 5%

** - significant at 1%

APPENDIX C4

E X T R A V E R S I O N

Appendix C4 shows the gross correlation coefficients between extraversion and the ramaining factors.

FACTORS CORRELATING WITH EXTRAVERSION	STUDENT GROUPS				
	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B.PAED.	TOTAL
Academic Performance	0,142	0,229	0,199	-0,031	0,140
Scholastic Aptitude	0,334*	0,287*	0,294**	-0,016	0,191*
High-School Achivement	0,024	-0,143	-0,085	-0,095	-0,134
Neuroticism	-0,221	-0,097	-0,152	-0,314*	-0,203*
Commuter Time	0,076	-0,104	-0,034	-0,299*	-0,130
Father's Education	-0,185	0,053	-0,036	0,249	0,078
Mother's Education	0,113	0,024	0,066	0,044	0,068
Parent's Education	-0,052	0,041	0,017	0,187	0,083
Father's Occupation	-0,210	0,142	0,004	0,128	0,055
Study Facilities	0,119	-0,040	0,021	0,220	0,093
Home Regime	-0,048	0,160	0,056	0,466*	0,145
Part-Time Commitments	-0,206	-0,101	-0,156	-0,011	-0,121
Age	0,016	-0,324*	-0,185	0,047	-0,099
Sex	0,203	0,017	0,087	-0,048	0,075
Financial Aid	-0,099	-0,124	-0,103	-0,195	-0,120
Residence	-0,149	0,142	0,013	-0,021	-0,013
Career Aspiration	-0,244	-0,016	-0,103	0,220	-0,010

* - significant at 5%

** - significant at 1%

APPENDIX C5

N E U R O T I C I S M

Appendix C5 shows the gross correlation coefficients between neuroticism and the remaining factors.

FACTORS CORRELATING WITH NEUROTICISM	STUDENT GROUPS				
	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED	TOTAL
Academic Performance	-0,191	-0,108	-0,138	0,088	-0,048
Scholastic Aptitude	-0,451**	0,006	-0,197	0,173	-0,094
High-School Achievement	-0,284	-0,072	-0,144	-0,018	-0,076
Extraversion	-0,221	-0,097	-0,152	-0,314*	-0,203*
Commuter Time	0,127	-0,127	-0,017	0,178	0,049
Father's Education	0,144	0,074	0,098	0,014	0,067
Mother's Education	0,314	0,184	0,226*	0,171	0,210*
Parent's Education	0,250	0,150	0,182	0,087	0,152
Father's Occupation	-0,003	0,087	0,044	-0,039	0,016
Study Facilities	-0,076	0,148	0,061	0,003	0,041
Home Regime	-0,250	-0,096	-0,170	-0,333*	-0,202*
Part-Time Commitments	-0,263	-0,076	-0,158	-0,107	-0,144
Age	-0,003	0,211	0,119	-0,170	0,028
Sex	-0,144	-0,192	-0,174	-0,191	-0,179*
Financial Aid	0,149	-0,149	-0,029	0,123	0,016
Residence	0,169	-0,014	0,064	0,043	0,055
Career Aspiration	-0,155	-0,093	-0,117	0,037	-0,069

* - significant at 5%

** - significant at 1%

APPENDIX C7

COMMUTER TIME

Appendix C7 shows the gross correlation coefficients between commuter time and the remaining factors.

FACTORS CORRELATING WITH COMMUTER TIME	STUDENT GROUPS				
	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B.PAED	TOTAL
Academic Performance	-0,037	0,017	-0,003	-0,309*	-0,099
Scholastic Aptitude	0,144	0,145	0,150	0,155	0,150
High-School Achievement	0,130	-0,070	0,004	-0,133	-0,059
Extraversion	0,076	-0,104	-0,034	-0,299*	-0,130
Neuroticism	0,127	-0,127	-0,017	0,178	0,049
Father's Education	-0,424**	-0,063	-0,228*	-0,064	-0,162
Mother's Education	-0,333*	-0,040	-0,154	0,052	-0,087
Parent's Education	-0,428**	-0,057	-0,213*	-0,020	-0,142
Father's Occupation	-0,545**	-0,087	-0,279**	-0,069	-0,198*
Study Facilities	-0,527**	-0,393**	-0,439**	-0,424**	-0,434**
Home Regime	-0,110	-0,195	-0,149	-0,009	-0,112
Part-Time Commitments	-0,099	0,056	-0,003	0,091	0,020
Age	0,094	0,085	0,089	-0,044	0,042
Sex	0,144	0,236	0,267*	-0,048	0,105
Financial Aid	0,083	-0,051	0,078	-0,155	-0,061
Residence	0,370*	0,226	0,247*	0,319	0,329**
Career Aspirations	0,274	0,252	0,259*	-0,196	0,056

* - significant at 5%

** - significant at 1%

APPENDIX C8

F A T H E R ' S E D U C A T I O N

Appendix C8 shows the gross correlation coefficients between father's education and the remaining factors.

FACTORS CORRELATING WITH FATHER'S EDUCATION	STUDENT GROUPS				
	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED	TOTAL
Academic Performance	0,083	0,153	0,128	-0,062	0,048
Scholastic Aptitude	-0,083	0,093	-0,029	0,029	-0,009
High-School Achievement	-0,242	-0,202	-0,234*	-0,293	-0,201*
Extraversion	-0,185	0,053	-0,036	0,249	0,078
Neuroticism	0,144	0,074	0,098	0,014	0,067
Commuter Time	-0,424**	-0,063	-0,228*	-0,064	-0,162
Mother's Education	0,584**	0,605**	0,605**	0,566**	0,579**
Parent's Education	0,906**	0,875**	0,892**	0,928**	0,900**
Father's Occupation	0,758**	0,385**	0,564**	0,801**	0,657**
Study Facilities	0,253	-0,060	0,080	0,117	0,094
Home Regime	0,051	0,101	0,054	0,095	0,061
Part-Time Commitments	0,011	0,008	-0,040	0,039	-0,017
Age	0,018	-0,236	-0,118	0,110	-0,035
Sex	-0,089	-0,232	-0,270**	-0,144	-0,229**
Financial Aid	-0,017	-0,275*	-0,201	-0,195	-0,217*
Residence	-0,391*	0,034	-0,076	0,364*	0,100
Career Aspiration	-0,112	-0,042	-0,027	-0,174	-0,070

* - significant at 5%

** - significant at 1%

APPENDIX C9

M O T H E R ' S E D U C A T I O N

Appendix C9 shows the gross correlation coefficients between mother's education and the remaining factors.

FACTORS CORRELATING WITH MOTHER'S EDUCATION	STUDENT GROUPS				
	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED.	TOTAL
Academic Performance	-0,140	0,124	0,047	-0,126	0,037
Scholastic Aptitude	-0,060	0,140	0,034	0,147	0,060
High-School Achievement	-0,345*	-0,130	-0,212*	-0,018	-0,175*
Extraversion	0,113	0,024	0,066	0,044	0,068
Neuroticism	0,314	0,184	0,226*	0,171	0,210
Commuter Time	-0,333*	-0,040	-0,154	0,052	-0,087
Father's Education	0,584**	0,605**	0,605**	0,566**	0,579**
Parent's Education	0,873**	0,915**	0,899**	0,832**	0,876**
Father's Occupation	0,438**	0,178	0,291**	0,434**	0,332**
Study Facilities	0,164	-0,065	0,021	0,174	0,064
Home Regime	-0,013	0,182	0,081	-0,146	0,032
Part-Time Commitments	-0,116	-0,105	-0,137	-0,072	-0,131
Age	0,178	-0,194	-0,055	-0,107	-0,066
Sex	-0,144	-0,236	-0,253*	-0,196	-0,235**
Financial Aid	-0,083	-0,025	-0,040	-0,101	-0,067
Residence	-0,370*	0,054	-0,057	0,175	0,037
Career Aspiration	-0,037	0,035	-0,040	0,010	-0,023

* - significant at 5%

** - significant at 1%

APPENDIX C10

PARENT'S EDUCATION

Appendix C10 shows the gross correlation coefficients between parent's education and the remaining factors.

FACTORS CORRELATING WITH PARENT'S EDUCATION	STUDENT GROUPS				
	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED.	TOTAL
Academic Performance	-0,023	0,153	0,097	-0,098	0,049
Scholastic Aptitude	-0,081	0,132	0,003	0,086	0,027
High-School Achievement	-0,326*	-0,182	-0,249*	-0,205	-0,212*
Extraversion	-0,052	0,041	0,017	0,187	0,083
Neuroticism	0,250	0,150	0,182	0,087	0,152
Commuter Time	-0,428**	-0,057	-0,213*	-0,020	-0,142
Father's Education	0,906**	0,875**	0,892**	0,928**	0,900**
Mother's Education	0,873**	0,915**	0,899**	0,832**	0,876**
Father's Occupation	0,684**	0,303**	0,470**	0,734**	0,566**
Study Facilities	0,238	-0,070	0,056	0,157	0,090
Home Regime	0,024	0,162	0,076	-0,002	0,053
Part-Time Commitments	-0,054	-0,060	-0,100	-0,007	-0,080
Age	0,104	-0,237	-0,096	0,020	-0,056
Sex	-0,198	-0,333*	-0,372**	-0,286	-0,345**
Financial Aid	-0,050	-0,149	-0,116	-0,226	-0,151
Residence	-0,311	-0,014	-0,121	0,213	0,008
Career Aspiration	0,068	0,048	-0,027	-0,234	-0,090

* - significant at 5%

** - significant at 1%

APPENDIX C11

F A T H E R ' S O C C U P A T I O N

Appendix C11 shows the gross correlation coefficients between father's occupation and the remaining factors.

FACTORS CORRELATING WITH FATHER'S OCCUPATION	STUDENT GROUPS				
	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED.	TOTAL
Academic Performance	0,022	0,281*	0,191	0,022	0,129
Scholastic Aptitude	-0,176	-0,046	-0,121	0,062	-0,063
High-School Achievement	-0,152	-0,268*	-0,237*	-0,274	-0,215*
Extraversion	-0,210	0,142	0,004	0,128	0,055
Neuroticism	-0,003	0,087	0,044	-0,039	0,016
Commuter-Time	-0,545**	-0,087	-0,279**	-0,069	-0,198*
Father's Education	0,758**	0,385**	0,564**	0,801**	0,657**
Mother's Education	0,438**	0,178	0,291**	0,434**	0,332**
Parent's Education	0,684**	0,303*	0,470**	0,734**	0,566**
Study Facilities	0,195	0,135	0,164	0,191	0,173
Home Regime	0,083	-0,054	0,003	0,020	0,005
Part-Time Commitments	0,005	-0,067	-0,059	0,048	-0,031
Age	-0,131	0,047	-0,027	0,171	0,044
Sex	-0,029	-0,087	-0,065	-0,049	-0,060
Financial Aid	0,149	0,025	0,078	-0,287	-0,043
Residence	-0,190	-0,024	-0,097	0,108	-0,013
Career Aspiration	0,199	0,010	0,078	-0,247	-0,019

* - significant at 5%

** - significant at 1%

APPENDIX C12

STUDY FACILITIES

Appendix C12 shows the gross correlation coefficients between study facilities and the remaining factors.

FACTORS CORRELATING WITH STUDY FACILITIES	STUDENT GROUPS				
	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED.	TOTAL
Academic Performance	0,075	0,208	0,171	-0,002	0,075
Scholastic Aptitude	0,175	-0,050	0,021	0,241	0,092
High-School Achievement	-0,003	-0,061	-0,053	0,007	0,001
Extraversion	0,119	-0,040	0,021	0,220	0,093
Neuroticism	-0,076	0,148	0,061	0,003	0,041
Commuter Time	-0,527**	-0,393**	-0,439**	-0,424**	-0,434**
Father's Education	0,253	-0,060	0,080	0,117	0,094
Mother's Education	0,164	-0,065	0,021	0,174	0,064
Parent's Education	0,238	-0,070	0,056	0,157	0,090
Father's Occupation	0,195	0,135	0,164	0,191	0,173
Home Regime	0,129	0,158	0,135	0,009	0,101
Part-Time Commitments	0,210	0,054	0,094	0,239	0,136
Age	-0,261	-0,080	-0,142	-0,160	-0,149
Sex	-0,370	-0,122	-0,217*	-0,335*	-0,269**
Financial Aid	-0,331	0,200	0,022	-0,012	0,015
Residence	-0,330	-0,311*	-0,309**	-0,492**	-0,360**
Career Aspiration	-0,125	-0,171	-0,198	0,075	-0,124

* - significant at 5%

** - significant at 1%

APPENDIX C13

H O M E R E G I M E

Appendix C13 shows the gross correlation coefficients between home regime and the remaining factors.

FACTORS CORRELATING WITH HOME REGIME	STUDENT GROUPS				
	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED.	TOTAL
Academic Performance	0,123	0,123	0,116	-0,083	0,030
Scholastic Aptitude	0,025	0,126	0,085	0,003	0,068
High-School Achievement	0,176	0,174	0,175	-0,173	0,091
Extraversion	-0,048	0,160	0,056	0,466**	0,145
Neuroticism	-0,250	0,150	0,182	0,087	0,152
Commuter Time	-0,110	-0,195	-0,149	-0,009	-0,112
Father's Education	0,051	0,101	0,054	0,095	0,061
Mother's Education	-0,013	0,182	0,081	-0,146	0,032
Parent's Education	0,024	0,162	0,076	-0,002	0,053
Father's Occupation	0,083	-0,054	0,003	0,020	0,005
Study Facilities	0,129	0,158	0,135	0,009	0,101
Part-Time Commitments	0,313	-0,097	0,128	0,106	0,128
Age	-0,101	-0,157	-0,129	0,122	-0,071
Sex	0,179	0,096	0,067	-0,155	0,000
Financial Aid	0,019	0,154	0,007	-0,220	-0,073
Residence	0,200	0,067	0,003	0,161	0,068
Career Aspiration	0,317	-0,188	-0,129	0,111	-0,054

* - significant at 5%

** - significant at 1%

APPENDIX C14

PART-TIME COMMITMENTS

Appendix C14 shows the gross correlation coefficients between part-time commitments and the remaining factors.

FACTORS CORRELATING WITH PART-TIME COMMITMENTS	STUDENT GROUPS				
	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED.	TOTAL
Academic Performance	0,267	-0,042	0,068	0,176	0,046
Scholastic Aptitude	0,005	-0,139	-0,040	0,210	0,021
High-School Achievement	0,232	0,026	0,122	-0,032	0,115
Extraversion	-0,206	-0,101	-0,156	-0,011	-0,121
Neuroticism	-0,263	-0,076	-0,158	-0,107	-0,144
Commuter Time	-0,099	0,056	-0,003	0,091	0,020
Father's Education	0,011	0,008	-0,040	0,039	-0,017
Mother's Education	-0,116	-0,105	-0,137	-0,072	-0,131
Parent's Education	-0,054	-0,060	-0,100	-0,007	-0,080
Father's Occupation	0,005	-0,067	-0,059	0,048	-0,031
Study Facilities	0,210	0,054	0,094	0,239	0,136
Home Regime	0,313	-0,097	0,128	0,106	0,128
Age	-0,240	0,060	-0,062	-0,125	-0,080
Sex	-0,083	-0,290*	-0,204*	-0,271	-0,222*
Financial Aid	-0,053	0,160	0,045	-0,047	0,042
Residence	-0,311	-0,187	-0,231*	-0,266	-0,248**
Career Aspiration	0,188	-0,136	-0,000	0,133	0,034

* - significant at 5%

** - significant at 1%

APPENDIX C15

A G E

Appendix C15 shows the gross correlation coefficients between age and the remaining factors.

FACTORS CORRELATING WITH AGE	STUDENT GROUPS				
	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED.	TOTAL
Academic Performance	-0,033	-0,076	-0,061	0,149	0,030
Scholastic Aptitude	0,046	-0,111	-0,042	-0,055	-0,046
High-School Achievement	-0,073	0,327*	0,186	-0,036	0,055
Extraversion	0,016	-0,324*	-0,185	0,047	-0,099
Neuroticism	-0,003	0,211	0,119	-0,170	0,028
Commuter Time	0,094	0,085	0,089	-0,044	0,042
Father's Education	0,018	-0,236	-0,118	0,110	-0,035
Mother's Education	0,178	-0,194	-0,055	-0,107	-0,066
Parent's Education	0,104	-0,237	-0,096	0,020	-0,056
Father's Occupation	-0,131	0,047	-0,027	0,171	0,044
Study Facilities	-0,261	-0,080	-0,142	-0,160	-0,149
Home Regime	-0,101	-0,157	-0,129	0,122	-0,071
Part-Time Commitments	-0,240	0,060	-0,062	-0,125	-0,080
Sex	0,029	0,159	0,109	-0,048	0,060
Financial Aid	-0,033	0,149	0,085	-0,323*	-0,044
Residence	0,190	-0,014	0,070	0,150	0,103
Career Aspiration	0,037	0,260*	0,173	-0,220	0,053

* - significant at 5%

** - significant at 1%

APPENDIX C16

S E X

Appendix C16 shows the gross correlation coefficients between sex and the remaining factors.

FACTORS CORRELATING WITH SEX	STUDENT GROUPS				
	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED.	TOTAL
Academic Performance	0,026	0,229	0,152	0,000	0,030
Scholastic Aptitude	0,029	0,123	0,174	0,000	0,090
High-School Achievement	0,093	0,236	0,157	0,146	-0,030
Extraversion	0,203	0,017	0,087	-0,048	0,075
Neuroticism	-0,144	-0,192	-0,174	-0,191	-0,179*
Commuter Time	0,144	0,236	0,267*	-0,048	0,105
Father's Education	-0,089	-0,232	-0,270**	-0,144	-0,229**
Mother's Education	-0,144	-0,236	-0,253*	-0,196	-0,235**
Parent's Education	-0,198	-0,333*	-0,372**	-0,286	-0,345**
Father's Occupation	-0,029	-0,087	-0,065	-0,049	-0,060
Study Facilities	-0,370*	-0,122	-0,217	-0,335*	-0,269**
Home Regime	0,179	0,096	0,067	-0,155	0,000
Part-Time Commitments	-0,083	-0,290*	-0,204*	-0,271	-0,222*
Age	0,029	0,159	0,109	-0,048	0,060
Financial Aid	0,0364*	0,025	0,110	0,155	0,119
Residence	0,169	0,142	0,154	0,064	0,118
Career Aspiration	0,199	0,054	0,110	-0,098	0,046

* - significant at 5%

** - significant at 1%

APPENDIX C17

F I N A N C I A L A I D

Appendix C17 shows the gross correlation coefficients between financial aid and the remaining factors.

FACTORS CORRELATING WITH FINANCIAL AID	STUDENT GROUPS				
	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED.	TOTAL
Academic Performance	0,132	-0,075	-0,098	-0,020	-0,164
Scholastic Aptitude	0,083	0,050	0,066	0,020	0,074
High-School Achievement	0,236	0,556**	0,370**	0,287	0,345**
Extraversion	-0,099	-0,124	-0,103	-0,195	-0,120
Neuroticism	0,149	-0,149	-0,029	0,123	0,016
Commuter Time	0,083	-0,051	0,078	-0,155	-0,061
Father's Education	-0,017	-0,275*	-0,201	-0,195	-0,217*
Mother's Education	-0,083	-0,025	-0,040	-0,101	-0,067
Parent's Education	-0,050	-0,149	-0,116	-0,226	-0,151
Father's Occupation	0,149	0,025	0,078	-0,287	-0,043
Study Facilities	-0,331	0,200	0,022	-0,012	0,015
Home Regime	0,019	0,154	0,007	-0,220	-0,073
Part-Time Commitments	-0,053	0,160	0,045	-0,047	0,042
Age	-0,033	0,149	0,085	-0,323*	-0,044
Sex	0,364*	0,025	0,110	0,155	0,119
Residence	0,052	-0,097	-0,048	-0,161	-0,113
Career Aspiration	0,188	-0,125	-0,024	0,207	0,033

* - significant at 5%

** - significant at 1%

APPENDIX C18

R E S I D E N C E

Appendix C18 shows the gross correlation coefficients between residence and the remaining factors.

FACTORS CORRELATING WITH RESIDENCE	STUDENT GROUPS				
	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED.	TOTAL
Academic Performance	-0,031	0,123	0,057	0,085	0,029
Scholastic Aptitude	-0,169	0,133	0,000	0,043	0,029
High-School Achievement	-0,110	0,086	0,083	-0,108	-0,098
Extraversion	-0,149	0,142	0,013	0,021	-0,013
Neuroticism	0,169	-0,014	0,064	0,043	0,055
Commuter Time	0,370*	0,226	0,247*	0,319*	0,329**
Father's Education	-0,391*	0,034	-0,076	0,364*	0,100
Mother's Education	-0,370*	0,054	-0,057	0,175	0,037
Parent's Education	-0,311	-0,014	-0,121	0,213	0,008
Father's Occupation	-0,190	-0,024	-0,097	0,108	-0,013
Study Facilities	-0,330	-0,311*	-0,309**	-0,492**	-0,360**
Home Regime	0,200	0,067	0,003	0,161	0,068
Part-Time Commitments	-0,311	-0,187	-0,231*	-0,266	-0,248**
Age	0,190	-0,014	0,070	0,150	0,103
Sex	0,169	0,142	0,154	0,064	0,118
Financial Aid	0,052	-0,097	-0,048	-0,161	-0,113
Career Aspiration	0,276	-0,024	0,109	0,088	0,104

* - significant at 5%

** - significant at 1%

APPENDIX C19

C A R E E R A S P I R A T I O N

Appendix C19 shows the gross correlation coefficients between career aspiration and the remaining factors.

FACTORS CORRELATING WITH CAREER ASPIRATION	STUDENT GROUPS				
	SENIOR PRIMARY	JUNIOR SECONDARY	DIPLOMA	B. PAED.	TOTAL
Academic Performance	0,125	0,119	0,122	0,037	0,094
Scholastic Aptitude	-0,318	-0,054	-0,110	0,234	0,033
High-School Achievement	-0,097	-0,035	-0,083	0,048	-0,044
Extraversion	-0,244	-0,016	-0,103	0,220	-0,010
Neuroticism	-0,155	-0,093	-0,117	0,037	-0,069
Commuter Time	0,274	0,252	0,259*	-0,196	0,056
Father's Education	-0,112	-0,042	-0,027	-0,174	-0,070
Mother's Education	-0,037	0,035	-0,040	0,010	-0,023
Parent's Education	0,068	0,048	-0,027	-0,234	-0,090
Father's Occupation	0,199	0,010	0,078	-0,247	-0,019
Study Facilities	-0,125	-0,171	-0,198	0,075	-0,124
Home Regime	0,317	-0,188	-0,129	0,111	-0,054
Part-Time Commitments	0,188	-0,136	-0,000	0,133	0,034
Age	0,037	0,260*	0,173	-0,220	0,050
Sex	0,199	0,054	0,110	-0,098	0,046
Financial Aid	0,188	-0,125	-0,024	0,207	0,033
Residence	0,276	-0,024	0,109	0,088	0,104

* - significant at 5%

** - significant at 1%

APPENDIX D

MULTIPLE CORRELATION COEFFICIENTS

The various factors in the multiple correlational analysis are represented by numbers. These numbers together with the factors they represent, are given below:

1	:	Academic Performance
2	:	Scholastic Aptitude
3	:	High-School Achievement
4	:	Extraversion
5	:	Neuroticism
7	:	Commuter Time
8	:	Father's Education
9	:	Mother's Education
11	:	Father's Occupation
12	:	Study Facilities
13	:	Home Regime
14	:	Part-Time Commitments
15	:	Age
16	:	Sex
17	:	Financial Aid
19	:	Career Aspirations

Three factors: Interests (6), Parent's Education (10) and Residence (18), were excluded from the analysis for reasons mentioned earlier.

Appendix B6 explains how the symbols used in multiple correlation are interpreted.

MULTIPLE CORRELATION COEFFICIENTS

Correlation Coefficients

FACTORS CORRELATED	GROUP				
	SP	JS	DIP.	B. PD.	TOTAL
r_{12} (gross)	0,029	0,079	0,033	-0,082	-0,013
$R_{1.2\ 3}$	0,260	0,113	0,142	0,206	0,304
$R_{1.\ 2\ 3\ 4}$	0,300	0,235	0,231	0,206	0,320
$R_{1.\ 2\ 3\ 4\ 5}$	0,406	0,252	0,266	0,235	0,324
$R_{1.\ 2\ 3\ 4\ 5\ 7}$	0,411	0,270	0,266	0,278	0,352
$R_{1.\ 2\ 3\ 4\ 5\ 7\ 8}$	0,422	0,320	0,299	0,443	0,354
$R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9}$	0,509	0,328	0,301	0,454	0,355
$R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11}$	0,514	0,391	0,324	0,460	0,364
$R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11\ 12}$	0,517	0,464	0,375	0,468	0,365
$R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11\ 12\ 13}$	0,533	0,468	0,387	0,468	0,366
$R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11\ 12\ 13\ 14}$	0,613	0,473	0,392	0,540	0,378
$R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11\ 12\ 13\ 14\ 15}$	0,617	0,476	0,396	0,553	0,380
$R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11\ 12\ 13\ 14\ 15\ 16}$	0,620	0,530	0,439	0,553	0,383
$R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11\ 12\ 13\ 14\ 15\ 16\ 17}$	0,620	0,533	0,444	0,563	0,392
$R_{1.\ 2\ 3\ 4\ 5\ 7\ 8\ 9\ 11\ 12\ 13\ 14\ 15\ 16\ 17\ 19}$	0,629	0,565	0,457	0,573	0,402