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AN EXAMINATION OF THE SELECTION PROCEDURES, FINAL ASSESSMENT AND TEACHING CAREERS OF PHYSICAL EDUCATION STUDENTS IN COLLEGES OF EDUCATION.

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SUMMARY.

This study arose out of a conviction, based on observation and research reports, that the expensive and time-consuming selection and assessment procedures of Specialist Colleges of Physical Education lack simple reliability and validity. It is further based on the suspicion that the criteria operative in these procedures are increasingly at variance with the function which practitioners of this subject will be expected to have in the schools as a result of recent trends in developmental psychology.

In 1971, data were collected relating to the performances at interview and during final examinations of 1163 physical education students and 554 students of other subjects at ten colleges of education in England and Wales. This was supplemented with information collected by questionnaire relating to:

a) the eventual careers of 95 physical education and 84 academic subject candidates not offered places after college interviews,

b) the eventual careers of a random sample of 140 physical education teachers who had left college between ten and twenty years before,

and c) the personality traits of 94 physical education students (measured by R.B.Cattell's 16 P.F. questionnaire).

The analyses of the data were carried out using I.C.L. 1904A, I.C.L. 1906A and Olivetti 101 computers. The statistical techniques employed were chi-square, multiple correlations, regression and t-test.

The accuracy of the college interview ratings as predictors of students' performances in the colleges examinations differed among the colleges, but in most cases the selection procedures were of low predictive value. Approx-

imately 80% of both physical education and other subject candidates who were not offered college places obtained degrees or teacher-training qualifications at other institutions of higher education.

Significant differences were observed in the rating of physical education students compared with students of other subjects in the various aspects of the colleges' courses. In particular, the physical education students tended to obtain higher ratings at personality interviews and for teaching ability, higher grades in main subject final examinations, but lower grades in English and subsidiary subject examinations.

The studies of the physical education students showed that:

a) those whose personality measurement included high scores on Extraversion, Stability and Toughmindedness were likely to receive higher grades in the college final examinations than those who scored high on Introversion, Anxiety and Tendermindedness,

and b) those who were most successful in the college final examinations were more likely to be employed ten to twenty years after leaving college in lecturing and inspectors' posts, while those who obtained low final examination marks were likely to be still teaching in schools.

The findings of this investigation are discussed in the light of a general re-appraisal of the educational functions and value of Physical Education as a school "subject". Traditionally, it has been valued mainly for its contribution to the physical development and well-being of children. Now, there is an increasing tendency to see it as having a psychologically and sociologically important role to play in the intellectual and social development of children. This tendency is partly the result of recent advances in the psychology of intellectual development and has been fostered by the inclusion of Physical Education in university syllabi for Bachelor of Education degrees.

CONTENTS.

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Diolch yn fawr!

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CHAPTER ONE.

INTRODUCTION.

"The trouble with people is not that
they don't know but that they know
so much that ain't so."

JOSH BILLINGS.

"Encyclopaedia of Wit and Wisdom".

1.1 SELECTION AND EXAMINATIONS IN COLLEGES OF EDUCATION.

Opinion in England and Wales is divided on the subject of the reliability and validity of the selection procedures and examinations in educational institutions. In some areas, the "11+" examination is used as the sole guide to a child's suitability for a grammar-school education; some local education authorities also take into account the child's performance during his primary school career and the comments contained in his headteacher's report, while in some areas comprehensive schools have replaced the grammar schools, and normally children are automatically admitted to them at the age of about eleven.

In universities, many departments use good performances in the G.C.E. 'A' level examinations by candidates as the only criterion for admission to their courses, while other departments within the same universities require students to attend interviews. In addition, there are some universities more disposed than others to consider candidates who have not achieved success in G.C.E. examinations.

There would appear to be more agreement among colleges of education in respect to the selection of students for teacher-training courses. Generally, for entrance to the colleges, applicants are selected initially for interview on the basis of their G.C.E. examination attainments and the headteachers' reports of their suitability for the teaching profession. Normally the interviews at the college consist of discussion with a number of college lecturers at which candidates' academic ability and personality are subjectively assessed. In addition, some departments such as art, handicrafts and physical education require candidates to demonstrate their ability in those fields. Thus it could be said that colleges take great pains to ensure that they select the right type of student. Yet some consider that selection for places and examinations for students at colleges of education may be fraught

with few difficulties for two main reasons:

a) all students attending these institutions normally intend to become teachers eventually, and it has been suggested that in institutions where students are being prepared for particular vocations, the system of selection and examination is simplified because the selection procedures need only to be compared with some measure of occupational performance, and the final examination can be used to validate the course selection procedures once it has been discovered how far the final examination is a criterion of occupational proficiency (Farmer, 1934),

and b) the competition for places is not very great. The Central Register and Clearing House reported in 1970 that 37,949 students were admitted to colleges of education in 1969 and only 1,545 qualified candidates were rejected.

Nevertheless, colleges of education still require all candidates to attend interviews and to take examinations during their three-year courses. If the elaborate selection procedures and examinations to which students are required to submit themselves are useful and valid, it follows that:

a) those whom the colleges select are superior to those whom the colleges reject,

b) those students graded highest at interview are more successful during the college courses,

and c) having completed successfully a teacher-training course, the students obtaining the final examination higher grades

are more likely to be promoted to posts of higher responsibility.

However, the research evidence available does not support these contentions. In fact the colleges' selection procedures have been described as too time-consuming, too costly (up to £680,000 throughout the country every year), and not related to students' eventual college performances (Evans, 1959; Start, 1968); while the college of education examination results have been shown to be inappropriate and unrelated to the students' success in their teaching careers (Start, 1968; Rée, 1970).

1.2 PHYSICAL EDUCATION STUDENTS IN CHANGING TIMES.

Though generalisations have often been made about the selection procedures and examinations in colleges of education, the position varies considerably from one subject group to another. In particular, physical education appears to constitute a special case; there has been no shortage of applicants in recent years. Six hundred places per year have been available for male students at the ten "advanced main" colleges in England and Wales, and it has been estimated that there have been approximately three thousand candidates applying for them annually (Hargreaves, 1968). There has been little recent research relating specifically to the selection procedures and examinations for physical education students in colleges of education in England and Wales. However, there has been growing criticism of the nature and objectives of physical education programmes in schools and the attitudes and abilities of the physical education teachers who teach them. One college of education principal (formerly an experienced headmaster) stated that he has always been impressed by physical education teachers' agility, skill and keenness to teach able games players, but that he rarely saw a

physical education teacher doing what he considered "good" teaching, that is encouraging the fat, lazy, awkward, flatfooted, physically shy and retarded boys (Percival, 1967).

The tasks of colleges of education are mainly to select and prepare people for the particular job of teaching. But an added problem has existed for physical education departments in colleges of education in recent years because of the changing perception of the physical education teachers' role in schools. The Board of Education's first proposals on the content of physical training for use in schools was published in 1902 after consultation with the War Office! At the time, "drill" was taught in schools, often by former army instructors, and the methods of instruction consisted mainly of the instructor's demonstrating the exercises with the children being required to follow his example. Thus, over the years it has been an accepted, indeed a required feature of the physical education teacher that he be physically fit and skilful in sport. However, more recent publications superseding previous physical training syllabuses have contained implied criticism of "formal" methods of physical education teaching (Ministry of Education, 1952; Department of Education and Science, 1972a). Additionally during the last twenty years there has been growing agreement, reflected in other physical education literature, that the "goals" and objectives should change and that there should be more of an emphasis on the educational benefits to be derived from physical education and less on the actual physical processes. The suggestion has been made that the physically fit physical education teacher is not necessarily the type to be concerned with the educational aspects of the subject (Percival, 1967). Nevertheless a high level of physical ability remains a pre-requisite for admission to physical education teacher-training courses in colleges of education in England and Wales today, and many highly intelligent applicants are refused places because they are not particularly physically

skilful.

Recent apparent progress in physical education such as in the construction of sports halls and gymnasia, the provision of extensive playing fields and "all-weather areas", the design of equipment, and the introduction of new terminology in physical education lessons may lead the layman to believe that vast changes have been made in the content of schools' and colleges' physical education programmes during the last two decades. However, it has been shown that this in fact is not the case and that the largest proportion of the time in colleges is still being allocated to the students' own practical performance (Whitehead, 1969). Many have criticised the physically fit physical education teachers and lecturers for being unsympathetic to the needs of the less-able performers in schools (Davies, 1966; Percival, 1967). Some physical educationists have accepted the criticisms as justifiable, attributing the situation to the confusion about the real objectives of physical education in schools and colleges. It has even been suggested that the very nature of the persons selected for physical education teacher-training has militated against a change of programme content and approach (Whitehead, 1965 & 1969; Joyce, 1967; Hendry, 1970). Thus the first problem which this study identifies is related to the purpose and effect of the requirement of athletic or games ability in the physical education teacher but not in his academic subject counterpart.

A second problem arises from the fact that in the 1960's when the B.Ed. degree was introduced by universities, colleges' physical education departments had to convince the authorities that the content of their subject met the criteria necessary for inclusion in an academic degree course. Recognition of academic subject students for the degree generally posed no similar problem. Some universities remained unconvinced of the physical educationists' case, others required radical revision of the colleges' syllabuses (Campbell, 1969). The Department of Education report

on teacher-training in 1972, with its recommendations of a two-year academic course followed by a one-year professional training in colleges has also caused physical educationists to consider how the practical content of the physical education courses might (if at all) fit into what could become a new type of teacher-training (though the Report does suggest that practical subjects such as domestic science and physical education may need "different" treatment).

These developments have served to emphasise that physical education still tends to be viewed as a practical activity which has little or no academic content. It could be said that the content of colleges' physical education courses and the nature of the students selected for them have not in any way allayed the suspicions of the academics. But the unfortunate aspect of the situation is that there is only a brief period of time in which decisions have to be made about the patterns of future courses in the colleges, the nature of the students to be admitted to them, and how to fit these into the pattern of the reorganisation of higher education in Britain.

Research literature which highlights the problems of selection and curriculum development in physical education is not abundant. Solutions to the problems are nowhere in sight. The value of physical education while self-evident to those who teach it is not easy to justify in rational and objective terms (Davies, 1966).

1.3 PURPOSES OF THE STUDY.

Criticisms of physical education teachers and recent developments in higher education tend to suggest that in the selection of physical education students there is a need for the outmoded procedures and criteria to be looked at afresh. Hence this investigation is based on the premise that, in the case of physical education students, rather

radical adjustments may need to be made to meet an entirely changed situation. A parallel study of the academic subject students in the colleges provides a useful comparison of the relative success of the selection and assessment of the two different groups of students.

The enquiry was initiated with six main purposes in mind:

a) to examine the validity of the system of selection of male physical education students for colleges of education courses in England and Wales,

b) to examine the validity of the system of selection of male academic subject students for colleges of education courses in England and Wales,

c) to establish what alternative careers are selected by those students who fail to gain college places after their interviews,

d) to ascertain the nature of the relationships existing between the initial assessment (headmasters' reports, G.C.E. results, and interview gradings) of physical education students and students of other subjects and performance during the college courses (final examination results, course assessments and teaching marks).

e) to seek to analyse whether any of the assessments made of physical education students during college courses may be regarded as reliable predictors of the students' future success in their profession.

and f) to endeavour to discover the nature of the relationships between college assessments and personality as measured by Cattell's 16 Personality Factor Questionnaire.

1.4 PROBLEMS ASSOCIATED WITH THIS TYPE OF INVESTIGATION.

Two very general aims of this study are:

a) to provide information that would begin to fill some of the gaps that exist in the present research literature,

and b) to highlight some areas in which future research might well be profitable in a narrower field than this study sets out to consider.

After careful consideration of the complex and numerous and interdependent variables involved, it was decided that a broad study of colleges' selection procedures and examinations would be of value when relating the findings to recommendations about future policy decisions. Previous studies (Halliwell, 1966; Kane, 1968) have been confined to one college only, but there are seventy-seven colleges in England and Wales at which a male student can attend a physical education main subject three-year course and it has been shown that what applies in one college may well be different from the situation in another (Whitehead, 1969). Therefore to ensure a breadth of study from which generalisations could be made, it was decided to study a sufficiently large proportion of the seventy-seven colleges of education.

The Department of Education and Science recognises ten colleges in England and Wales as providing "advanced main level" physical education courses (see Appendix A; other colleges' courses are described as "main level") and normally these are the more attractive courses for the student who sees his future in physical education. These "advanced main" courses are often the "model" for other colleges to emulate, and occasionally some of the "main" courses have been "promoted" to "advanced main" status by the Department of Education and Science. Conclusions from the findings

of a study of the ten colleges' courses might thus apply to other physical education courses. The value of a parallel study of the records of the academic students at these ten colleges is in establishing the existence or otherwise of a relationship between the assessment of physical education teachers and other student teachers. Ideally a random selection of non-specialist colleges would be used to collect this information, but for this study the records of non-physical education students at the same ten colleges were examined.

Finally, it is acknowledged that the standards and criteria for assessment may differ among the colleges selected and indeed within any one college among its staff. For instance, some college lecturers will tend to give higher teaching marks to those students who demonstrate a happy relationship with schoolchildren, whereas other lecturers will regard the principal criterion of teaching ability to be the mastery of one's subject. The investigation attempts incidentally to highlight any conflicts such as these that arise. However, in order that comparisons can be made, the literal grades given to students by the different staffs must be interpreted as though the staffs are using a similar system of awarding the grades from "A" (the outstanding students) to "E" (failures) whatever their individual criteria may be for defining "an outstanding student". Similarly, discrepancies between markers on a numerical basis cannot be totally eradicated, but the justification for comparing grades awarded by different markers is that valuable information may still be extracted. In the first instance, one is looking for gross relationships of either a positive or a negative nature. Should any be observed, the magnitude of these could be examined in greater depth subsequently by the author or other researchers.

Summarizing, the problem presented concerns the status of established student selection and examination procedures operated by colleges of education for physical education students in a changed and changing

educational situation. The changes in question concern the revised goals, content and method of physical education as a part of the general curriculum of schools.

CHAPTER TWO.

REVIEW OF LITERATURE.

"One of the more surprising aspects of education
is that our ignorance of what teachers do
and how to train them is profound".

W.D.WALL (1968).

Formerly Director of the National Foundation for Educational Research, now Professor of Educational Psychology and Head of Department of Child Development and Educational Psychology, University of London Institute of Education.

2.1 INTRODUCTION.

Comments on the available research on teachers and teacher education refer frequently to the vast quantity of material that has been published. Approximately seven hundred articles on teachers and teacher education have been published since the beginning of the present century (Sandford and Trump, 1950); ten per cent of all articles in the field of educational psychology were on teachers (Wiseman, 1959), and it has been affirmed that there was such a wealth of material that even the bibliographies were "becoming unmanageable" (Start, 1966, page 3). An adequate summing up of the situation seems to have been made by the researchers who found eight hundred studies which had been published since 1950 and stated "they are too numerous for individual mention, much less for adequate treatment" (Getzels and Jackson, 1963, page 506). Taking into account:

a) the several thousand recent studies of teacher education in the United States (Gage, 1963),

b) the review of recent British research relevant to teacher education in the form of evidence to the Select Committee on Education and Science (Cane, 1970),

and c) the analyses of teacher behaviour and student achievement studies (Rosenshine, 1971),

the scope of the review of literature in this present research will be limited to particular areas.

Though there is such an enormous amount of material available, little of it is of a kind capable of helping in the determining of policy (Taylor, 1970), while there are still particular areas of research in teacher education in which to date there has been little interest (Shipman, 1970). One such area is that of the education of male physical education teachers

in Britain. Any critical examination of the present state of physical education in England and Wales should be done bearing in mind its origins, how it differs from other school and college subjects, the comparatively short time it has been an accepted feature of schools' and colleges' programmes in its present form, and the nature of those people who opt to qualify in the subject.

Since a complete factual account of the development of physical education since 1800 is now available (McIntosh, 1968), it will be necessary to provide here only a brief picture of the development in the courses for physical education teachers and a comparison with the provisions made for the intending teachers of other subjects.

2.2 THE CHANGING EMPHASES IN PHYSICAL EDUCATION.

Organising Physical Activity.

Physical activity included in teacher-training courses in the latter half of the nineteenth century was merely for the recreational benefit of the students, physical education not being recognised as a subject for teacher training. Cricket and football were played in most men's colleges, but

> "physical education for women students was limited to a military drill of a modified kind under the direction of a sergeant" (Rich, 1933, page 208).

This resulted in the mass of children attending elementary schools at that time not receiving instruction in physical activity (Major, 1966).

In 1902, the Board of Education took steps to remedy the situation by publishing its first syllabus for use by teachers of physical activity, it was called "The Model Course of Physical Training". The document was

produced after consultation with the War Office (!) and it has been reported that it was not well received (McIntosh, 1968). The publication stated quite clearly what was required of the teachers:

> "The teacher should carry a staff, or barbell, or dumb-bells, according to the instruction which the class is receiving; he should teach as much as possible by illustration; and he will be careful, in order to stimulate the intelligence and interest of the children, to explain clearly, in simple terms, the reason of every movement and formation" (page 5).

Thus it was only seventy years ago that organised physical activity based on official syllabuses appeared in schools, therefore the nature of physical education in schools and colleges today should be studied bearing this fact in mind.

Recognition of Educational Effects.

This first publication was soon superseded (in 1904) by "The Syllabus of Physical Exercises". The Syllabus claimed that an "educational effect" as well as a "physical effect" could be derived from its proposed exercises for the pupils, whereas on the subject of the teachers' involvement:

> "From the evidence put before us...we conclude that there are many teachers who for one reason or another cannot reasonably be expected to qualify themselves for giving instruction in physical exercise. We have in view more particularly the case of teachers, men and women, in or beyond middle life..." (page 5).

Though the syllabus emphasised that exercises should be taught by illustration, the teacher could avoid being active himself if he placed "a smart scholar" in front of the class to demonstrate.

Further revisions took place in 1905, 1909 and 1919. During this period, the physical education lessons in State schools were taught by class teachers or former Army personnel, though women's specialist physical education colleges began to appear in 1885 and the students from these moved into girls' Public and High Schools (McIntosh, 1968). Of the first twelve specialist physical training courses in existence, eleven were at privately run colleges, only one was for men, and entrants had to be eighteen years of age and physically fit (Jones, 1924). Though there was a claim for an "educational" effect of the subject, the emphasis of these early courses was mainly on the physical health aspect and this is not surprising perhaps, for the schools' physical exercise was under the supervision of the Board of Education's medical department at the time.

Need for 'Specialists'.

In a Board of Education report on the training of teachers in 1925 (The Burnham Report), the Committee suggested that physical training "demands a brief reference" (page 133). It also stated that physical training should not necessarily be in the hands of specialists in elementary schools, for class teachers received one hundred hours of physical education during their college course (many present-day colleges have less than half that amount, Rains, 1969). Though the place of physical training was seen as separate from the remainder of the curriculum in schools, the Committee announced that their attention had "been drawn to the change in ideas accompanying recent development...the limited sense of drill has given place to a conception of cooperation between the teacher and child...concurrently the type of instruction in the training college

has altered". The Committee expressed its belief that during the one-year course of teacher-training for graduates, there was insufficient time to provide an adequate physical training course (nevertheless these courses in 1973 still provide a physical education training and a certificate of education course concurrently in the same length of time). Additionally, the Committee commented on the need for the establishment of more colleges for men physical training teachers.

In 1926, The Education of the Adolescent (Hadow Report) commented on the need for more adequate provision for the full training of male teachers of physical exercise. In 1933 a new Syllabus of Physical Training was published by the Board of Education. It broadened the scope of the subject, inspired teachers to rely more on their own initiative in their programme planning, and it coincided with the opening of the men's first physical training college, Carnegie College at Leeds. The 1937 Physical Training and Recreation Act suggested that the Board could provide one or more national colleges of physical education. The 1939 Spens Report on Secondary Education placed great emphasis on the value of physical education. The 1939 N.U.T. Committee of Investigation on the Training of Teachers also realised the need for more specialist teachers of physical education and recommended a basic course in the subject for all teachers.

The Second World War delayed much of the implementation of the recommendations of these various reports, though during that time the number of colleges offering specialist courses in physical education increased to eight for women and three for men. In 1944 the McNair Report ("Teachers and Youth Leaders") recommended that physical education be a compulsory subject for all teachers, and that additionally, courses for specialist physical education teachers be increased in number. However, the Report made allusion to the problem of status for physical education teachers and recommended that there should be no discrimination in terms of salary, or promotion to posts of responsibility or headship. This

appears to be the first official recognition that though provision was being made to ensure that the importance of the subject in relation to others in the colleges was equalised, in fact in the views of his colleagues the physical education teacher was still associated with the drill sergeant. Later reports tended to repeat the value of the subject and the need for all teachers to have some training in physical education, but were pre-occupied with problems other than the careers later in life of physical education teachers.

A Change of Approach.

The Ministry of Education's publication in 1952 of "Moving and Growing" and "Planning the Programme" to "replace the 1933 Syllabus of Physical Training" (Moving and Growing Foreword) marked one of the important landmarks in the history of physical education. The Ministry no longer stated the objectives of the subject and the publications included no tables of lessons for teachers to follow. Furthermore it entailed not only less direction of the teachers' efforts in physical education, but it also emphasised the importance of a new, informal approach in the teaching of the subject:

> "These then are the various opportunities we might expect to find. (in physical education lessons)" (Moving and Growing, page 53. The underlining is the writer's).

The Department of Education and Science (1972a) publication "Movement" superseded the above two publications but emphasised similar purposes:

> "It is the role of physical education to offer....varied movement experiences....." (page 8).

There were no tables of lessons contained in this latest publication, there was simply discussion on child development and children's need for movement during the different stages of life from the age of five to thirteen.

Though the Department quoted no research findings to support its claim for a new approach, the Department's Inspectorate were not alone in believing that physical activity made an important contribution in human development. During recent years, the researchers in the field of the intellectual development have included Jean Piaget whose work in Geneva has added strength to the theory that the intellect develops in stages. Piaget, a psychologist, trained as a biologist and in his work he has stressed the importance of physical activity particularly in the early stages of intellectual development (the sensori-motor stage). Intelligence operates by means of two basic functions, each of which forms one aspect of adaptation to the environment. These two functions, "assimilation" and "accommodation" are complementary. The infant investigates his surroundings, he grasps, sucks, explores, probes, shakes, absorbs and "assimilates". The environment (people and things) on the other hand resists, moves, hurts, avoids, punishes and rewards, thus compelling the infant to "accommodate" (Piaget, 1950). Later, in play, the child grasps, swings and throws, involving a process of repetition and assimilation, and eventually throws for the pleasure of throwing, and swings for the sake of swinging, etc. That is, play is regarded as the extreme pole of assimilation of reality to the ego, as well as having something of the creative imagination which is the motor of future thought and reason (Piaget, 1951).

Many other psychologists have emphasised that in the learning process a child's progress needs to be explained in terms of external influences as well as the internal processes. Though at first a child may be seen as a helpless individual, nevertheless there seems to accompany this

helplessness a propelling curiosity about the environment and a self-reinforcing activity seemingly designed to achieve competence in that environment, this has been called the "will to learn" (Bruner, 1966) and "a competence motive" (White, 1959). Recent emphases appear to be on the fact that with children, things are lived rather than thought and that there is a reliance early in a child's life on movement experience (Bruner, 1956; Vygotsky, 1962).

The implications of the work of Piaget and many other investigators have been summarised (Burgess, 1965) and the importance of motor experience, playing games with children, providing stimulating and diversified learning experiences have all been shown to be important platforms for learning. A summary of the research findings related to physical education has shown also how physical activity may specifically assist in the changing of attitudes, improving of social efficiency, improving of sensory perception, assisting in mental health as well as in the acquisition of skill (Scott, 1960). In addition, researchers have reported the sociological values of sport (Biddulph, 1954; Yukie, 1955; Bensten et al, 1955). Other evidence has been produced to show that present-day physical education specialists may make contributions in the field of special education additional to their roles as sports coaches. For instance, in the case of educationally sub-normal boys, it has been found that physical activity has an important contribution to make towards their social prestige (Oliver, 1952), and that as a result of periods of physical education their mental as well as their physical ability improved (Oliver, 1958).

Thus a wealth of literature may be found pointing to the mental and social as well as the physiological benefits to be derived from physical activity. This might lead one to believe that at present times there is a need for a "new kind" of physical education teacher. No longer is there a need for a person whose sole concern is the physical development of the children in his care. Nowadays, there is a need for a person with a

highly sophisticated knowledge of the integration of physical education with intellectual and personality development. However, more recently the concern seems to have been with getting more physical education students into the colleges and less emphasis on the nature or the quality of these students.

A Proliferation of Courses.

In 1960, the Ministry of Education's circular on the 'Balance of Training' in training colleges proposed that 80% of the output of the colleges should be channelled into primary schools. In the same year, the A.T.C.D.E. report "Colleges of Education for Teaching" revealed a shortage of physical education 'specialists' and recommended that many of the present colleges offering physical education as a short compulsory course to all students should be permitted to offer physical education as a main course to teachers who wished to teach that subject for the larger proportion of their working week in schools. The Committee on Higher Education's Report (1963) "Higher Education" advocated the inclusion of other subjects in specialist physical education colleges' courses. Thus enabling physical education teachers to teach other subjects in schools. In the same year, the Ministry of Education (Newsom Report) saw the need for students who would be able to assist the physical education teachers in schools, to be permitted to study the subject at a subsidiary level to their main subject.

The result was an expansion of the number of colleges offering "main" physical education courses, the products of which were predominantly trained for work in primary schools, and the former "specialist" courses being designated "advanced main" courses the products of which were trained for secondary schools. Additionally, more colleges offered physical education as a second or subsidiary level subject to students whose main subjects were in other departments in the colleges.

The Plowden Report (1966) emphasised the changes in the nature of primary schools' physical education in recent years, its becoming more of a "movement period" associated with drama and music. The Report did not wish to see "specialist" physical education teachers being trained for primary schools.

With the introduction of different types of "comprehensive" systems of schools in the late 1960s, there came with the re-organisation of secondary education, schools called "Middle Schools". These schools designated for children in England and Wales of ages usually between eight years and twelve years, or between nine years and thirteen years, fell neither into the "junior" nor the "secondary" school category, therefore to ensure that its views on physical education within these schools became known, the Department of Education and Science have had published a number of pamphlets (1970a, 1970b, 1971). The first, "Launching Middle Schools" suggested that the physical education in the schools should be taken by class teachers "for a large proportion of the time" (page 12). It also suggested that boys and girls could be taught in mixed classes in physical education. The second publication, "Towards Middle Schools" confirmed the "feasibility" of teaching mixed groups but intimated that some schools may wish to have a physical education "specialist" to teach that subject, whereas the latest publication (P.E. 8-13) recommends an appointment to the staff of a "specialist" in physical education, but his function to be more of an adviser in his subject, with class teachers teaching physical education lessons "wherever possible" (page 36).

Colleges of Education have immediately met this challenge, and main courses are now being offered for physical education students who wish to take up appointments in middle schools. That is men and women students may attend "main level" physical education courses as a preparation for junior school teaching, or "middle school" "main level" courses or secondary school "main level" courses, or "advanced main level" courses.

Additionally, there are within the colleges, courses which may be attended by other subject students so that they become qualified to teach or assist in teaching physical education in the various types of schools.

Physical Education - A Degree Subject?

The advent of B.Ed. degree courses in colleges in the late 1960s produced yet further changes in the nature of physical education courses and in some areas tested the universities' attitude to physical education as a subject. In 1966, the Central Register and Clearing House Interim Report on B.Ed. Degree Courses stated that some universities were worried concerning "practical subjects" being offered at degree level. The 1966 Enquiry into the Education and Training of Teachers published by London University stated:

> "no studies were barred in advance by the University as unsuitable for the degree. The intention was rather to wait and see whether syllabuses in such subjects as Handicrafts and Physical Education were, in fact, appropriate to what, after all, was an academic award".

Campbell (1969) reported difficulties experienced by some colleges in obtaining university sanction to offer a B.Ed. degree course for its physical education students, though degree courses were available for students of other subjects at those colleges.

The D.E.S. Report (1972) on teacher training further highlighted the "different" nature of physical education in the eyes of those qualified in other subjects. Though recommending that future college of education courses should consist of the first two years of the study of an academic subject followed by one year of an education course, in the case of physical education, the Report suggested that "colleges might

choose to concentrate very largely on education-oriented courses" (page 69) in the first two years.

SUMMARY.

Thus in seventy years, in addition to name changes, the subject has changed from formal army type drill instruction to a less formal approach with the emphasis more on educational benefits and less on physical effects of the physical education. Teachers no longer have to adhere rigidly to published syllabuses, they have freedom to select their own programme content. Over the years, there has been stressed a need to train "specialists" in the subject, but recently it has been stated that they are not required in either junior or middle schools. Nevertheless, colleges appear to be offering a proliferation of physical education courses which qualify teachers to specialise in the subject at all age-ranges throughout schools.

Concurrent with this reported progress, however, there seems to remain the problem of the status of the physical education teacher compared with that of his colleagues. There remains an association in the minds of many of the old drill instructor with his present-day counterpart, physical education departments in colleges are aware of this but whether they are attempting, or indeed can do something about it is not yet ascertained. Some would suggest that there is a need for colleges to consider whether the students whom they are selecting will become the best teachers of physical education. Because not only has the nature and scope of the subject in schools changed in recent years, but so has the length and the nature of the colleges' courses.

2.3 THE METHODS OF SELECTING STUDENTS FOR COLLEGES OF EDUCATION COURSES.

Some Views on Selection.

When attempting to select the best person to teach the subject and he who would also gain the respect of his teacher colleagues, physical education departments do not have an easy task. The value of interviewing procedures has been viewed with scepticism:

> "The prediction of performance in student teaching and/or professional teaching is one of the longstanding, unsolved and perhaps (some would say) unsolvable problems of educational psychology" (Gough, 1968, page 119).

While it has been demonstrated that though batteries of psychological tests may be reasonably accurate at school level, it is difficult in higher education to predict future attainment (Entwistle, 1971). The law of supply and demand may be one of the most important factors affecting the selection of students for colleges of education for the Department of Education and Science does not expect the supply of teachers to meet the national demand until 1975 (Taylor, 1969a). In 1967/68, it appears that there were 52,892 applicants for places, of whom only 4,911 were eventually unplaced (of these 3,795 were graded as unacceptable). The situation does not vary among the various academic subjects. For instance, it has been noted that of the 820 Science places available, only 520 (63%) were filled (Wenham, 1968). Additionally, it should be mentioned that a number of colleges situated in more attractive surroundings, and others with a national reputation for offering "good" courses are able to be very selective, whereas other colleges receive a very large percentage of students rejected by these more popular colleges. This point is emphasised by the fact that some

colleges have had 70% of their entrants holding two or more G.C.E. 'A' levels, and only 0.7% with the minimum qualifications. On the other hand, some colleges have had nearly 25% of their students with only five G.C.E. 'O' level passes - the minimum entrance qualifications (Simons, 1965). In physical education, however, there are a large number of highly qualified applicants available (Hargreaves, 1968).

As far back as 1931, Cattell reviewed the existing literature on interviews and found that the main qualities for which interviewers were looking were (in rank order): "Personality and Will, Intelligence, Sympathy and Tact, Open mindedness, Sense of Humour, Idealism, General Culture, Kindness, Enthusiasm" (page 67). Cattell noted that these were permanent characteristics and were not susceptible to training, he also noted that only "Intelligence" was measurable objectively at that time. These findings stress the importance of the selection procedures if the qualities which it is thought are required to make a good teacher are not those which can be acquired through training.

Lawton (1939) was of the opinion that even in the hands of an experienced interviewer, the interview could yield extremely unreliable results. When considering the possible values of interviews, it is necessary to look very closely at the different factors that are considered by different interviewers, and bear in mind the fact that they are attempting to predict which students are likely to complete successfully a teacher-training course.

Criteria Used During Selection.

Most institutions require a minimal attainment in examinations such as British colleges of education requirement for at least five passes in the G.C.E. 'O' level examinations. In fact many colleges insist on a much higher level than the minimum requirement. One is likely to deduce therefore that there is a relationship between academic attainment and

and teaching ability. Johnson and Morris (1937) found that students admitted to a New York State College for Teachers with less than the average academic attainment normally required were usually less satisfactory than others in teaching ability. But Lovell (1951) in a study in England found that provided a minimum level of intelligence was attained, the possession of an academic type of certificate such as the School Certificate did not appear to affect the standard of teaching ability.

Similar disparity in findings are observed in the researches in Britain and in other countries on the relationship between intelligence of the students and their teaching ability. Nandi (1941), Carlile (1954) and Tarpey (1965) report insignificant relationships between the two variables, but La Duke (1945) and Kemp (1947) show a more positive relationship. There are numerous studies of this nature, and many point out that the nature of the correlations in such researches are affected by the homogeneity of the groups and by the particular intelligence scale used. In addition to intellectual qualities, colleges are looking for other abilities. In a close examination of interview procedures, Burroughs (1958) discovered that three factors were operating:

> "(a) A factor based on the observable features of the applicant,
> (b) A factor based on judgments of the intellectual maturity of the applicant and his ability to express himself,
> (c) A factor based on a number of personality traits thought to be important in teaching". (page 37).

A follow-up showed that the first two factors gave the best prediction of teaching ability.

In a study of non-academic interests and pre-college experience it has been discovered that students with pre-college teaching experience tended to obtain high teaching marks more frequently than other students, this also

tended to apply to students who had had pre-college experience in jobs other than teaching. Another finding was that students with pre-college membership of Drama or Music groups tended to obtain higher teaching grades. The Group emphasised that many of the items commonly used in interviewing schedules failed to discriminate between students securing high and students securing low teaching marks (The Training College Research Group, University of Birmingham Institute of Education, 1960).

The value of more objective measurements of students' abilities has been stressed in the reports of findings on a study of graduate teachers. It was reported that Cattell's 16 P.F. questionnaire was the best single predictor of students' teaching marks. Successful students tended to have a high level of general culture, high conscientiousness, to have tender-minded attitudes to education, and to participate fairly widely in social activities (Warburton et al., 1963). These research findings may simply serve to illustrate the different criteria that different lecturers, or different groups of lecturers prefer to utilise.

In a thorough study (albeit of one college) it was found that the college interview rating to be one of the most important predictors of success in the teacher-training course. The reporting of the findings was made cautiously, pointing out that the process in that college of interviewing and grading students at teaching may well have contained common factors the values of which remained out of scrutiny (Halliwell, 1966). Allen et al (1956) took great pains to stress the need for far more rigorous methods of interviewing, however. In their examination of group methods of selection, individual interviews and a number of objective tests of intending student teachers by the follow-up method, they found that the group selection method correlated more highly with personality assessments and practical teaching than with examination results.

Recent investigations have found that in most colleges of education, the principals, deputy principals or other senior members of the colleges were

involved in the interviews and that heads of departments were also usually members of the interview boards. One-third of the colleges selected on the basis of 'promising material' for teaching, then thought in terms of the main course; two-thirds of the colleges balanced the criteria (Eason, 1970). Thus one finds a comparative lack of agreement in the criteria used and in the reported values of selection procedures in predicting teaching ability. A comprehensive review of research carried out on selection for colleges of education in England summed up the situation by stating the opinion that the previous work done in the field gave scant confidence in the efficiency of selection procedures (Start, 1963 and 1966).

The Selection of Physical Education Students.

Though much that has been said about selection procedures may be generalised about selection for all subject courses, it has been indicated that at the interviewing stage before acceptance for college is finalised, a difference in selection is apparent between physical education students and other teacher-training students. The physical education students are expected to have attained a high level of ability in one or more sporting activities, and also have to complete a series of physical ability tests on the day of the interview, each college having constructed its own tests. (Hendry, 1970). These requirements are not to compensate for lack of G.C.E. 'A' level examination passes, for in the 1966 colleges' intakes, 47.5% of physical education students (at the men's "advanced main" courses) had two or more 'A' levels whereas only 37.5% of men accepted at colleges for other subjects had two or more 'A' level passes (Hargreaves, 1968).

Compared with other subject departments, these colleges offering "advanced main" level physical education can be very selective, for there are approximately three thousand applicants for about six hundred places annually (Hargreaves, 1968). It must be emphasised that practical ability tests were used in the selection procedures for entrance to the physical

education courses earlier this century and are not a recent innovation. The Physical Education Yearbook (1969) summarises what it appears that colleges are looking for:

> "Candidates must satisfy authorities at a personal interview as to character, probable suitability for the teaching profession and physical capacity for the specialist training".

These criteria seem not to have been challenged by extensive research in Britain. In a study of five women's colleges it was reported that the physical education practical interview tests lacked evidence of validity, the use of intelligence tests was not universal and that the criteria for selection were not objectively based (Ward, 1967). The relationship between practical selection tests and college performance of physical education students has also been studied in one men's college. The conclusion was that there was little relationship between scores on interview and scores in the students' final practical assessments, that there was little relationship between scores at interview and scores on the same practical test three years later. It was also pointed out that interview tests were more likely to be to the advantage of students who had come from schools where particular physical activities were taught (John and Wright, 1970). Knapp (1963) also emphasised that previous experience and training affected students' practical performance at interview.

Few people have attempted to explain the purpose of the practical tests, but in one study of the somatotype of physical education students and physical education staff in colleges, it was concluded that all tended to be mesomorphic and that it could be said that selection may have been based on self-image (Carter, 1964). Historically one can trace the need for practical tests for intending physical education students, because

earlier this century the nature of their school duties would have been very physically demanding in that they would have been required to demonstrate the physical activities which the pupils would then attempt to emulate. Nowadays, however, teaching is not by demonstration, but a high level of ability in practical tests is nevertheless still required of the physical education students, presumably because colleges believe that there is some positive relationship between practical ability and teaching ability in physical education.

This hypothesis has been tested and the conclusion was that practical performance in gymnastics, games etc. was not significantly related to the teaching ability of the students in two colleges used in the investigation, (Whitehead, 1970). One former headmaster, now a professor of education, was of the opinion that physical education lectures in colleges of education were more interested in being concerned with "experts in the physical" rather than "challenging the minds" (Davies, 1966, page 9). Another former headmaster, now a college of education principal, concurred with these views and suggested that physical education teachers were of the type that were skilful but keen only to teach other able physical performers (Percival, 1967).

It would appear that more research is required to attempt to make a small contribution to this hitherto much neglected area.

2.4 THE ASSESSMENT OF STUDENTS' ABILITIES IN COLLEGES OF EDUCATION.

Examination of Academic Ability.

A student arriving at a college of education to commence studies will be confronted by courses different from those which he would have been required to attend at any other college, though at the end of the three-year course the certification is identical. Additionally he will see different methods of assessment of his abilities, not only between colleges

but within the same colleges, and often within the same subject department he will meet staff whose criteria for assessing student's abilities differ markedly from those of their colleagues.

That there may not be agreement about the nature, the purpose or indeed the need for examinations or assessments within the colleges of education, or other institutions of higher education, is not a new phenomenon. Valentine (1932) urged that the importance of examinations as a measure of educational success should not be minimised despite, for instance, the low validity of essay marking; he deplored the suggestion that multiple-choice examinations should be used in a more widespread fashion in higher education. Hartog and Rhodes (1935) reviewed fully the examinations in existence at the time. They showed that results in examinations were subject to "halo" effects, independent judgement of criteria, verbal fluency, etc. Many examples were given of the fallibility of subjective examinations. Vernon (1940) reiterated some of the Hartog and Rhodes' criticisms and pointed out that validity is affected by coaching and question-spotting. He was however reluctant to recommend objective tests as a substitute because he believed that they would tend to destroy verbal abilities.

More recently, concern has been expressed over the validity of examinations in current use and in particular over the failure rate (Robbins Report, 1963, para. 582). An interesting fact reported was that the college of education wastage rate nationally was running at 5.3% per annum compared with 10.3% for women physical education students. Powell (1964) stated that validity and reliability of examinations was poor and one of the reasons for this was simply an ignorance of the rationale for the evaluation of students performance. He considered that it was an important aspect of examinations to promote learning and not merely to test memory. Krathwohl et al (1964) whilst claiming that there were various features of the affective domain which could be measured, they proposed that examinations should be held in order to assess the change

in student behaviour and that continuous assessment was the only valid measure of this. Mansell-Jones (1965) suggested that the present methods of examination tended to debase education, they restricted learning and ensured that students learned merely to become an examinee, working with worthwhile devotion only during the final year of a degree course.

Recently it has also been illustrated that universities still prefer to select research students on the basis of examination results in preference to students who obtained degrees by thesis, despite the fact that no significant correlation has been found to exist between students' degree class and their later scientific research achievements (Whitehand, 1966). Himmelweit (1967) stressed that higher education examinations result in a life classification of ability. She discussed the value of objective testing and applauded the efforts of modern universities such as Essex, Sussex and Lancaster who have been less reluctant to change the traditional pattern of university examinations.

Ager and Weltman (1967) reviewed the whole field of examinations in use at the time and they made it clear that there was an inherent weakness in both the objective and subjective examining methods. Cox (1967) similarly compiled an extensive review of literature pertinent to the sphere of examinations. He discussed systematically the reliability of the various types of examination and their value in higher education, and concluded that more thought should be given to the educational objective in higher education and less to the technical methodology. Beard (1970) has also reviewed the literature on examinations and suggested that lamentations by teachers in universities and colleges that students worked only for examinations was a condemnation of the systems of assessment. More specifically on the subject of this thesis, Rée (1970) attacked vigorously the system of assessment in use at colleges of education and universities' institutes of education. He described as "Academic hypocrisy" the situation in which lecturers award "pass" marks to students whose essays

were in his judgement "appalling".

Though the foregoing paragraphs tend to reveal weighty evidence against the reliability and validity of examinations in colleges and universities, there are still many who would stress that there is danger in over-stressing the harm that examinations cause in education. Wiseman (1961) pointed out that without examinations, our educational system would become mainly therapeutic. Additionally, he reminded his readers that the alternatives proposed i.e. cumulative assessment and objective tests were themselves a form of examination and that they may be no more reliable or valid than subjective assessments unless their content is structured soundly. Mountford (1966) also defended the present method of examinations in higher education. One of the facts he quoted to support his argument was that Britain's wastage rate in universities compared favourably with the rest of the world. Oppenheim et al (1967) questioned the reliability of university examinations as predictors, but make a case for their retention as a selective procedure. Equally cautious was Westland (1969) who said that there was a danger in change for change's sake. He posited that the degree is a "standard", thus an examination was necessary to maintain it as such. Westland offered a suggestion that the student may be better suited to choose his own method of assessment; he concluded with the warning that objectivity, reliability and validity did not always mean fair, just and correct.

Literature on examinations in physical education in higher education is difficult to find. Generally, students attending three-year colleges of education courses in physical education are required to attend courses and sit examinations in subjects other than their main study. There is usually a theory of education course, a subsidiary or "second" subject course (which in most colleges has to be an "academic" subject), and some colleges require all students to attend a course in the English departments. In their own subject, students are usually taught and examined in the

practical teaching of physical education, the principles of physical education, anatomy and physiology, various practical activities (e.g. athletics, games, outdoor activities and swimming), and some colleges require students to pursue an independent study of a physical education topic of the students' own choice and submit a dissertation for a final assessment that counts towards the students' aggregate physical education mark. However, the content of the courses and the examinations in the men's "advanced main" physical education courses in this country have been found to be so dissimilar, that it would be futile for any employing authority to attempt to consider the relative merits of the achievements of students in any of the colleges with those of students from the other colleges (Whitehead, 1969). This present study may possibly make a small contribution to throw more light on this neglected area.

The Assessment of Teaching Ability.

An unfortunate lack of agreement and a considerable degree of contradiction has been found in the large amount of research on teacher effectiveness and characteristics (Halliwell, 1966). Perhaps this is not surprising when one considers other assertions that teachers perform differently when teaching different subjects, when confronted with different groups of pupils and when using different methods of teaching (Schonell et al., 1962). Additionally, one should take into account the different assessors who might be grading the students. Some are impressed by the teaching of children by well-planned lectures in which accurate information is imparted. Whereas some would consider the atmosphere created by the teacher and his relationship with pupils.

It is thus with caution that one peruses the vast amount of literature on the subject of teacher assessment. Such research appears to include an area of work carried out on the endowment of the "good" teacher, and another area on the relationship between the assessment of a student's

teaching ability during his college career and his ability assessed later during his teaching career. In the former category, a "pen-portrait" could have been built up if one had considered the findings of a number of researchers over the years. For example, there have been reported low correlation between academic subjects and teaching grade (Mead and Holley, 1916); significant correlations between teaching ability and leadership (Morris, 1929); significant relationships between teaching ability and such traits as care and appearance, initiative, sense of humour, etc. (Panton, 1934); moderate correlations using the Coxe Orleans Prognosis Test (Dodd, 1933); findings showing that better student-teachers were more tense, more dependable, better at concentration and less liable to depression (Vernon, 1939); and a significant relationship between teaching ability and attitude (Walters, 1957). However, a dissimilar picture may also be produced when other research findings are assembled: no significant correlations when using the Coxe Orleans Prognosis Test (Nandi, 1941); no significant relationship between teaching success and primary source traits of personality (Scwartz, 1950); significant relationship between teaching skill and academic achievement (Carlile, 1954), and no significant association between teaching success and attitude (Evans, 1952)!

The follow-up type of study, wherein teachers' teaching marks on leaving college are compared with those awarded to the same teachers a number of years later are also fraught with the problem of a number of variables, such as different criteria used by different assessors, different environments in which the teachers are assessed and not least the different reaction of children to an experienced teacher compared with their responses to a student. However, researchers have attempted to examine the value of a college teaching mark as a predictor of future success in teaching. In 1939, the National Union of Teachers Report found that colleges' teaching mark was not an indicator of future teaching ability in the classroom, but Tudhope (1942) reported that in a study of ninety-six teachers with a median

length of service of nine years, 68% had the same mark, 15% improved and 23% had a lower mark. In a study of graduate teachers twenty years after they qualified, though the teachers' marks were not re-graded in this study, it was shown that the teachers' present occupation was unrelated to his college attainment (Nisbet, 1954), whereas Dale (1955) concluded that there was not much agreement between final teaching mark and future success in the classroom. Others (Collins, 1959, Clark and Nisbet, 1963, and Simun and Asher, 1964) have found positive relationships in the 0.3 region between college teaching grade and headmasters' or inspectors' assessment later. But Start (1966) reported very low correlations between a teacher's college teaching mark and that awarded by his present headteacher, "the correlations were so low as to make the prediction of one criterion from another of little practical value".

In a recent publication, the findings of an investigation undertaken by questionnaire to colleges of education and university departments of education were reported. The conclusions were that the individual institutions were "looking for, and assessing, different behaviours and qualities in their students" (Stones and Morris, 1971, page 162). Furthermore they pointed out that "the wide diversity of assessment patterns among institutions, the variety and vagueness of many criteria and the idiosyncratic nature of their selection by institutions suggest to us that the certificates of the different area training organisations may be rewarding quite different student behaviours".

Again the picture regarding physical education teaching ability is not so clear because of a dearth of research in the field. Oliver (1956) studied physical education tutors' opinions on the importance of various student qualities, and abilities used in the assessment of the teaching mark in physical education. He reported that there appeared to be "general agreement throughout the profession as to what constitutes good teaching in physical education" (page 72). He noted that men and women

differed little in their views and that three main factors could be extracted, the first a general teaching factor (suggesting the presence of 'a halo'); a factor closely associated with personal and emotional qualities, and a third one (not so obvious with the men) a factor associated with knowledge of subject matter.

Some might obtain satisfaction from Oliver's findings, for physical education courses in colleges are often biased towards the pedagogical and practical performance work in games etc. Others might question such a weighting and query the absence of a great deal of intellectual work. Whitehead (1970) highlighted that there was little positive relationship between teaching ability and students' practical games performance. He suggested that there was a need for more research in this field particularly with the advent of the bachelor of education degree, for many universities were not convinced that credit for a physical education students' games performance should contribute towards his degree grade:

> "Does the training of teachers for physical education, putting all considerations of degrees on one side challenge the mind of the student? My quick answer to this question must be, if I am to be honest, not very much" (Professor H. Davies, 1966 page 9).

2.5 THE ENDOWMENT OF PHYSICAL EDUCATION TEACHERS COMPARED WITH OTHERS.

The term "teacher" is a convenient description generally used of a person whose duties are centred around teaching children in schools and of whom many people can build up a mental image. However, many studies have highlighted the different categories that lie within that description. Some have pointed out the different characteristics to be found when comparing grammar school teachers and primary school teachers, and between

those interested mainly in teaching the subject as opposed to those primarily interested in the children whom they teach. According to Vinacke (1957) 'stereotypes' are essentially concepts of people and that categorization by stereotypes is one of the basic social processes, but actual stereotypes can be distorted. Whitehead (1969) was of the opinion that physical education teachers were still often associated with sergeant drill instructors and regarded as being of lesser intelligence than other teachers. Musgrove and Taylor (1969) showed that the status of physical education teachers was seen to be lower than that of teachers of academic subjects and Appleby (1967) indicated that the physical educationists themselves perceived this during their training. A number of studies have examined the nature of the physical educationist comparing him with his academic subject counterpart and the findings build up an interesting picture of the attributes that the physical education male teacher usually possesses.

In terms of physique, physical educationists are predominantly of the mesomorphic somatotype (Carter, 1964). Sheldon (1942) found that mesomorphy correlated highly with such temperamental traits as love of physical adventure, indifference to pain, bold directness of manner and competitive aggressiveness. Hirst and Kelly (1970) confirmed Carter's findings and compared physical educationists with other student teachers. The 'academics' included endomorphs and ectomorphs, categories not found among the physical educationists, and were less mesomorphic.

A comparison of the ages of student teachers would show that 'advanced main' physical education students on the average were one year younger than other student teachers, but despite this the physical education students' academic qualifications would not be lower (Whitehead, 1965; Hargreaves, 1968). Whitehead (1965) also examined the socio-economic background of physical education students and discovered that in the two colleges in his sample, a larger percentage of the parents of physical

education students belonged to Groups I and II of the Registrar General's Classification of Occupations, than did the parents of other student teachers. A later study in another 'advanced main' college showed similar results (Fenn, 1971).

One comprehensive study comparing the many attributes of physical educationists in Britain with teachers of other subjects confirmed many of the separate findings of many authors reported in this section of the review of literature and concluded that physical education males were more muscular, stable and extraverted than other student teachers. They were more aggressive and competitive in their social responses, thus indicating that physical educationists have a poorer social insight. They were authoritarian, yet submissive to strong authority, and their attitude to teaching was more authoritarian. The physical educationists tended to like the attention and admiration of others and had a high achievement drive. The dangers of selection (either consciously or otherwise) of a <u>particular</u> type of student for physical education courses were also discussed in the study (Hendry, 1970).

The few recent researchers that have been related to the <u>type of person</u> a physical educationist is as opposed to merely his <u>physical</u> attributes tend to confirm that there is a physical educationist stereotype. However, though personality theory attempts to explain individual differences in relation to the interactions between a person's physical behaviour systems and the external environment, personality is extremely complex:

> "It is our conviction that no substantive definition of personality can be applied with any generality" (Hall and Lindzey, 1966).

Nevertheless, there have been a number of definitions including:

> "The sum total of the actual or potential behaviour patterns of the organism, as determined by heredity and environment" (Eysenck, 1947).

Furthermore, Eysenck (1961) viewed personality in terms of traits the similarities of which overlapped to show the existence of two main dimensions of personality, these he has called Extraversion-Introversion and Neuroticism. Cattell (1950) was also prepared to define personality:

> "Personality is concerned with all behaviour of the individual, both overt and under the skin".

His is perhaps the most complex of personality theories, and according to Cattell by use of questionnaires and factor analysis he has made it possible to give a complete description of the personality of adults in terms of sixteen factors. Cattell's factors originate from a dictionary study of thousands of words describing behaviour. Synonyms and words of rarity were omitted and resulted in one hundred and seventy words remaining which were reduced to twelve factors based on a factor analysis of the correlations of the descriptions. The factors were assigned an alphabetical letter, a name and a short description. Eventually four more factors were added, so that now a person may be described in terms of high or low scores on sixteen personality factors (Table I), or from these primary sources, in terms of second, third or fourth order factors (these being based on correlations between the various factors c. Gorsuch and Cattell, 1967; Warburton, 1969).

TABLE I.

Description of Cattell's Sixteen Personality Factors and Three Second Order Factors.

LOW SCORE DESCRIPTION.	FACTOR.	HIGH SCORE DESCRIPTION.
RESERVED, detached, critical, cool.	A.	OUTGOING, warmhearted, easy-going, participating.
LESS INTELLIGENT, concrete-thinking.	B.	MORE INTELLIGENT, abstract-thinking, bright.
AFFECTED BY FEELINGS, emotionally less stable.	C.	EMOTIONALLY STABLE, faces reality, calm.
HUMBLE, mild accommodating, conforming.	E.	ASSERTIVE, independent, aggressive.
SOBER, prudent, serious, taciturn.	F.	HAPPY-GO-LUCKY, impulsively, lively, gay.
EXPEDIENT, evades rules, feels few obligations.	G.	CONSCIENTIOUS, persevering, rule-bound.
SHY, restrained, diffident, timid.	H.	VENTURESOME, socially bold, uninhibited.
TOUGH-MINDED, self-reliant, realistic.	I.	TENDER-MINDED, dependent, sensitive.
TRUSTING, adaptable, free of jealousy.	L.	SUSPICIOUS, self-opinionated, hard to fool.
PRACTICAL, careful, conventional, proper.	M.	IMAGINATIVE, wrapped up in inner urgencies.
FORTHRIGHT, natural, sentimental.	N.	SHREWD, calculating, worldly.
PLACID, self-assured, confident.	O.	APPREHENSIVE, worrying.
CONSERVATIVE, respecting established ideas.	Q1	EXPERIMENTING, critical, free-thinking.
GROUP-DEPENDENT, a sound follower.	Q2	SELF-SUFFICIENT, prefers own decisions.
UNDISCIPLINED SELF-CONFLICT, careless of protocol.	Q3	CONTROLLED, socially-precise.
RELAXED, tranquil, unfrustrated.	Q4	TENSE, frustrated, overwrought.
LOW ANXIETY, life is generally satisfying.	SECOND ORDER FACTOR I	HIGH ANXIETY, dissatisfied with degree to which he is able to meet life's demands.

TABLE I contd.

LOW SCORE DESCRIPTION.	FACTOR.	HIGH SCORE DESCRIPTION.
INTROVERSION, shy, self-sufficient, a precision worker.	SECOND ORDER FACTOR II	EXTRAVERSION, socially outgoing.
TENDER-MINDED, emotionally troubled, artistic, gentle.	SECOND ORDER FACTOR III	TOUGHMINDED, enterprising, does the obvious.

It is upon the use of Cattell's Sixteen Personality Factor Questionnaire that most studies of the personality of physical educationists have appeared to have relied in recent years. The most sophisticated statistical treatment was that of Kane (1968). His study of seventy-five male physical educationists resulted in his observing that they differed markedly from the population means in surgency (Factor F), realism (Factor I) and to some extent in sociability (Factor A), adventurousness (Factor H) and will power (Factor Q3); they were significantly higher than other students on extraversion, whereas they tended to be lower on anxiety. Similar characteristics of physical education students using Cattell's questionnaire were reported in smaller sample studies (Whiting, 1966; Brookes, 1967). It is interesting also to note the findings relating to women physical education students (Kane, 1968; Webb, 1969; Jones, 1970). These three researchers showed that male and female physical education students have a very similar personality profile, there being no function that would significantly discriminate between them.

It may be encouraging to some to learn that men and women physical education lecturers in colleges appear to agree on the type of person to be admitted to teacher-training course, but the highly extraverted individual has not always been found to be the successful student in

higher education generally. Convincing evidence has been produced demonstrating the superiority of INTROVERTS in higher education (Savage, 1962; Lavin, 1967; Warburton, 1968). Though no constant pattern has yet been seen to emerge in colleges of education the tendency is still towards the more successful student being INTROVERTED (Halliwell, 1966; Curtis, 1966).

2.6 SUMMARY.

This survey has revealed that certain problems exist in respect of the selection, training and assessment of specialist teachers of physical education. It is not at all clear that existing procedures are appropriate in the changing situation which requires physical education teachers to be educationists rather than merely sports coaches, games players and athletes.

The impingement on physical education of recent psychological theories about the relationships between sensory-motor skill and the development of intelligence and personality (Piaget, 1950; Bruner, 1966; Vygotsky, 1962; White, 1959) has manifestly increased the pressure on colleges to include a larger intellectual content in physical education courses. This logical development of an increased educational emphasis in the subject has also been accentuated by university demands for B.Ed. degree courses which have a high academic content.

Attitudes of practitioners in this area are firm, if not entrenched, and many physical education lecturers in the colleges of education appear to be confident about the type of people they are selecting for their courses, that is the extraverted, physically skilful persons, and they also appear to have been content with providing courses the nature of which was more biased towards students' practical physical education skills rather than the stimulation of the students' intellect. There are however others who are apparently not so happy with the situation (Whitehead, 1965 and

1969; Davies, 1966; Percival, 1967; Joyce, 1967; Hendry, 1970). But convincing evidence that changes are necessary is not so easy to obtain. For what would be required would be to show that the facts are contrary to what the colleges believe. Generally it is believed that:

i) the more able practical games performers obtain higher teaching grades AND higher physical education examination marks,

ii) the more intellectually endowed students obtain higher marks in the college course,

iii) the higher graded students are more successful on leaving college,

and iv) the rejected students are not especially successful elsewhere.

If it can be shown that these beliefs are NOT in accordance with the facts, then it would appear to cast serious doubts on the efficacy of existing selection procedures and methods of assessment, sufficient to warrant a complete reappraisal.

Additionally, a study of the relationships between the personality traits of physical education students and their college course assessment should indicate whether the award of higher grades is simply a function of personality type, irrespective of true ability in the functions supposedly being measured.

The following chapters describe an attempt to collect data relevant to these questions in relation to the situation existing in ten colleges of education in England and Wales. Most of the data to be used in the

computations are contained within the colleges' files, and have been there for years. It is hoped that when the files are exposed to light in some cases for the first time in many years, light may also be cast upon some of the problems confronting physical educationists today.

CHAPTER THREE.

DESIGN OF THE INVESTIGATION.

"Nothing is certain but uncertainty".

A LATIN PROVERB.

3.1 INTRODUCTION.

Historically, the physical education teacher has been regarded as a physically skilful individual best able to demonstrate and elicit from his pupils physically skilful performances. However, the considerable research in education would suggest that physical education is a medium from which benefit other than the physiological may be derived by children and young people. But, there is no evidence to suggest that the physically clever physical education teacher is (or is not) the best person to ensure that children derive mental and social as well as physical effects from the subject. In fact, research in teacher education tends to demonstrate the inaccuracy of attempts to predict any performances in teaching or in academic studies. Yet, colleges of education still require candidates for physical education places to attend interviews at which predictions are made of their future performance in teaching and in academic studies. Furthermore, these students are required to take practical tests to demonstrate their physical prowess, and on the basis of these tests they may be refused places on the colleges' courses. Similarly, lecturers in the academic subject departments, regardless of the research demonstrating the unreliability of interviews and examinations, often select students by virtue of their examination attainment and on the basis of interview performances at the colleges. In addition, the criteria for assessing physical education and academic students during the colleges' courses appear to differ not only from college to college, but also among the staff of any one college. Thus there would appear to be a need for light to be shed on these problems so that the weaknesses, or strengths, of the colleges' policies in relation to selection and examining of students may be tested.

If current procedures for selection and assessment are valid, then the following hypotheses should be supported. If the evidence fails to support these hypotheses, then serious doubts must remain about the validity of these procedures.

3.2 HYPOTHESES.

1. Students who have obtained high G.C.E. 'A' level examination success are rated more highly by their headmasters and are awarded higher grades at the college interviews than students who have lower 'A' level success.
2. Students who have obtained high interview ratings are more successful in college final examinations than students who have obtained low interview ratings.
3. Students obtaining a high rating in one subject in the college final examinations tend to obtain higher ratings in all subjects than students obtaining a low rating in that subject.
4. Physical education students as a group tend to obtain mean ratings and grades which are either markedly worse or markedly better than students of other subjects.
5. Students who obtain high ratings in physical education examinations differ significantly in personality from those who obtain low ratings, and specifically that high achieving students tend to be high on traits contributing to Extraversion, Stability and Toughmindedness while low achievers tend to be high on traits related to Introversion, High Anxiety and Tendermindedness.
6. Students who obtain high ratings in college physical education examinations tend to be more successful in future careers than students who obtained low ratings.
7. Applicants attending interviews for places on college of education courses who receive unacceptably low ratings are unlikely to complete similar courses successfully at other colleges of education or at other institutions of higher education.

3.3 METHOD OF COLLECTION OF DATA.

The data to be used in the testing of the hypotheses were collected from ten colleges of education. The colleges selected were those regarded as leading the field in physical education and which the Department of Education and Science has designated as the only "advanced main" level courses in England and Wales (Appendix A). (The colleges shall remain anonymous in the body of this thesis and referred to as Colleges, I, II, III, IV, V, VI, VII, VIII, IX, and X - the numerals not being related to their alphabetical order). The principals, heads of physical education departments and academic registrars of the ten colleges agreed to cooperate in the investigation and visits were arranged at which it was planned to extract from students' records various details of the students and their achievements at school and college. In view of the large number of students involved, it was planned to confine some of the testing and retesting to one college.

A small number of difficulties were encountered in the data collection, such as the non-availability of some of the information required, a limit to the number of days/hours which one was permitted to intrude on the colleges' hospitality, and the inaccessibility of some of the colleges' records. Consequently a revision of the original plans had to be made, but the criterion during the collection of the data was that they should be in nature and volume as near to that which it had been planned to collect. Nevertheless, it did vary from college to college and a summary in Table 2 illustrates what information was available in the colleges, whilst Table 3 shows the numbers of students' records used in the research. Full details of the visits to the colleges and the collection of the data appear in Appendix B (I to X inclusive).

TABLE 2

Availability of records pertaining to Physical Education (PE) and Academic Students (AC) at various colleges.

COLLEGES		VARIABLES. (described on page 56)														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14-32	33-35
I	PE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	AC	✓	✓	✓	✓		✓	✓	✓	✓	✓					✓
II	PE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	AC	✓	✓	✓	✓		✓	✓	✓	✓	✓					
III	PE	✓	✓		✓	✓	✓	✓			✓					
	AC	✓	✓	✓	✓		✓	✓			✓					
IV	PE	✓		✓	✓	✓	✓	✓		✓	✓					
	AC	✓		✓	✓	✓	✓	✓			✓					
V	PE	✓	✓	✓	✓	✓	✓	✓		✓	✓					
	AC	✓	✓	✓	✓		✓	✓		✓	✓					
VI	PE	✓			✓	✓	✓	✓		✓	✓					
	AC															
VII	PE					✓	✓	✓		✓	✓					
	AC															
VIII	PE	✓			✓	✓	✓	✓			✓					
	AC															
IX	PE					✓	✓	✓			✓					
	AC															
X	PE					✓	✓	✓		✓	✓					
	AC															

1 Headmasters' Assessments.
2 G.C.E. 'A' Results.
3 Academic Interview.
4 Personality Interview.
5 Practical.
6 Education Theory.
7 Teaching Marks.
8 English Marks.
9 Subsidiary Subject.
11 P.E. Theory.
12 P.E. Dissertation.
13 P.E. Practical.
14 - 32 Personality.
33 P.E. Promotion.
34 - 35 Rejected Students.

TABLE 3

Numbers of students' records available for the enquiry at the various colleges.

COLLEGES	P. E. STUDENTS.			ACADEMIC STUDENTS.		
	1968 LEAVERS.	1969 LEAVERS.	1970 LEAVERS.	1968 LEAVERS.	1969 LEAVERS.	1970 LEAVERS.
I.	TOTAL POPULATIONS. (n = 138)			TOTAL POPULATIONS. (n = 165)		
II.	TOTAL POPULATIONS. (n = 106)			TOTAL POPULATIONS. (n = 104)		
III.	TOTAL POPULATIONS. (n = 158)			50% RANDOM SAMPLE. (n = 76)		
IV.	NIL.	TOTAL POPULATIONS. (n = 130)		NIL.	TOTAL POPULATIONS (n = 62)	
V.	TOTAL POPULATIONS. (n = 81)			50% RANDOM SAMPLE. (n = 147)		
VI.	TOTAL POPULATIONS. (n = 191)			------NIL------		
VII.	NIL.	TOTAL POPULATIONS. (n = 79)		------NIL------		
VIII	NIL.	TOTAL POPULATIONS. (n = 65)		------NIL------		
IX.	TOTAL POPULATIONS. (n = 98)			------NIL------		
X.	TOTAL POPULATIONS. (n = 117)			------NIL------		

3.4 SELECTION OF THE SUBJECTS.

For this particular study, two groups of students were selected to represent those who were attending physical education courses in colleges of education in England and Wales and those who were attending courses in other subjects at the colleges. In view of the fact that the physical education courses, the interviewing procedures and the methods of assessment of men and women students differ markedly, and thus to limit the number of variables, it was decided to confine the investigation to a study of male students only.

The Physical Education Students.

For the main part of the study, the physical education students selected were the total populations who had entered the colleges for three-year courses in 1965, 1966 and 1967. These particular years were chosen for a number of reasons:

i) it was considered that restricting the study to any one year would not have been representative of the colleges' normal processes of interviewing and assessing;

ii) the teacher-training courses had been increased in duration from two to three years in 1962 and it was considered necessary to have permitted the colleges three years in which to alter their courses, interviewing procedures and methods of assessment and any other revisions necessary owing to this new experience;

iii) the students were required to have completed their courses so that final examination results would be available;

iv) by selecting these particular years, one was able to contact those intending students who had <u>not</u> been accepted by the

colleges, and thus ascertain the alternative courses/ professions upon which they had embarked.

Rejected Students.

Of necessity there were a number of exceptions to the details described above. The vast amount of work involved precluded an investigation into the whereabouts of all students rejected by all the colleges in 1965, 1966 and 1967. Therefore this was confined to College I and the full details of the questionnaire response is in Table 4.

TABLE 4.

Details of returns of questionnaire sent to students rejected by College I.

	PHYSICAL EDUCATION CANDIDATES.	ACADEMIC SUBJECT CANDIDATES.
No. of questionnaires sent.	172	168
No. returned by G.P.O. franked "left this address".	10	13
Nil response.	67	71
No. of questionnaires completed and returned.	95 (58.6%)	84 (54.2%)

Follow-up.

In view of the short period of time that the selected group of students would have left the colleges (an average of about three years), it was decided that a follow-up to determine the success in their careers would be inappropriate. Therefore, this was considered to be more relevant with students who had left the colleges a number of years. A ten-year period was considered sufficiently long after leaving college for a student to have begun his climb up the promotion ladder, and as the records of all the colleges were not sufficiently accessible to extract the information, this was restricted to one college and extended over a ten-year period, i.e. concerned with a random sample of 25% of those students who left College I in the years from 1953 to 1962. Details of the returns appear in Table 5.

TABLE 5.

Present nature of employment of a random sample of 25% of the students who left College I between ten and twenty years ago. (n = 140).

No. of college records used (representing 25% of the total population).	No. of former students whose whereabouts were discovered.	Present Occupation of the former students.		
		Univ. & Coll. Lecturers.	Inspectors & Advisers.	School-masters.
215	140	45	17	78

Personality.

In the case of the personality testing, the main group of students studied in this research had left the colleges and therefore were not available for personality testing. However, students attending College I in more recent years were available and in order that their personality measurements could be related to their final examination results, the total populations of physical education students who entered College I in 1968 and 1969 were selected (n = 94).

All of the students described in the foregoing paragraphs will hereafter be referred to as 'the physical education students'.

The Academic Students.

It was considered that it would also be of interest and possibly of value to compare the physical education students with students of other subjects. Therefore an attempt was made to collect similar information (to that obtained for physical education students) from the same colleges' records of all students of other subjects who entered the colleges in the same years (1965, 1966 and 1967). To ensure that the criteria in selection procedures, headmasters' assessments and colleges' assessments were as near as possible to those of the physical education students (who were all training for secondary school work), those academic subject students who were training for primary schools were not included.

These students described in the last paragraph will hereafter be referred to as the 'academic students'.

3.5 MEASURES OBTAINED.

The data collected were assembled in four main groups:

i) Pre-College Entrance Grades (achievements or assessments made of students prior to their acceptance or rejection by the colleges to which they applied).

ii) Colleges' Assessments (course work or examination results that constituted the students' final certificate of education profile).

iii) Personality Traits (those personality factors that are measurable by using R.B. Cattell's 16 P.F. questionnaire).

iv) Post-College Success (the physical education students' employment ten to twenty years after leaving college, and alternative careers of students rejected by the colleges).

These measures of the students' abilities have been numbered and are described as follows (computer abbreviations appear in brackets):

i) Pre-College Entrance Grades (Collected from the Colleges' records. See Appendix B).

1. HEADMASTER'S ASSESSMENTS (HEADMA) - Headmasters' prediction of the students' potential as teachers.
2. G.C.E. 'A' LEVEL PASSES (GCALEV) - Students' ability as measured by the number of G.C.E. 'A' level examination passes obtained before entering college.
3. INTERVIEW ACADEMIC GRADES (INACAD) - Scores awarded for "academic ability" to students during oral interviews with college tutors.
4. INTERVIEW PERSONALITY GRADES (INPERS) - Scores obtained for "personality" by students during oral interviews with college tutors.

5. INTERVIEW PRACTICAL GRADES (INPRAC) - Scores obtained by physical education students only during a physical skill test as part of their college interviews. (Also in the case of handicraft students, scores obtained for their craftsmanship demonstrated at interview).

Administratively, it was possible to carry out a closer examination of the practical interviewing procedures at College I, therefore the opportunity to do so was taken.

In addition to extracting from the files the scores obtained by the students during their interview practical tests in 1965, 1966 and 1967, a random sample of 33⅓% of the total populations of those students (n = 55) were re-tested, using the same tests and under similar conditions, during the final term of their three-year course.

ii) Colleges' Assessments (Collected from the colleges' records. See Appendix B).

6. EDUCATION MARKS (EDUCMK) - Students' final marks in the education theory examinations, or the assessment of their ability during the three-year course in education.

7. TEACHING MARKS (TCHGMK) - Final marks awarded to students for teaching ability.

8. ENGLISH MARKS (ENGMAK) - Final marks obtained by students in their colleges' compulsory course in English.

9. SUBSIDIARY SUBJECT MARKS (SUBSID) - Final marks obtained by students in their "subsidiary" or second subject courses.

10. MAIN SUBJECT MARKS (MAINMK) - Final marks obtained by students in their college examinations for their main subject.

11. PHYSICAL EDUCATION THEORY MARKS (PETHEO) - For physical education students only - the first part of three divisions of marks that in total constitute their main subject marks.

12. PHYSICAL EDUCATION DISSERTATION MARKS (PEDISS) - Physical education students' scores in the second part of the main subject final examinations.

13. PHYSICAL EDUCATION PRACTICAL MARKS (PEPRAC) - Scores obtained in the third part of physical education students' main subject examinations.

iii) Personality Traits (Cattell & Eber, 1964, I.P.A.T. 16 P.F. Questionnaire).

Most recent personality studies of physical education students have used Cattell's 16 personality factor questionnaire (Whiting, 1966, Kane, 1968; Webb, 1969; Jones, 1970; Hendry, 1970). Therefore the students were assembled during the last term of their three-year course and completed that questionnaire under the procedures laid down in the instructions. The scoring of the personality factors is a standardised procedure, and in this study measurements of the sixteen factors plus three second order factors were obtained:

HIGH SCORE DESCRIPTION.

14. IPAT FACTOR A (FACTRA) - Outgoing.

15. IPAT FACTOR B (FACTRB) - More Intelligent.

16. IPAT FACTOR C (FACTRC) - Emotionally Stable.

17. IPAT FACTOR E (FACTRE) - Assertive.

18. IPAT FACTOR F (FACTRF) - Happy-Go-Lucky.

19. IPAT FACTOR G (FACTRG) - Conscientiousness.

20. IPAT FACTOR H (FACTRH) - Venturesome.

21. IPAT FACTOR I (FACTRI) - Tender-minded.

22. IPAT FACTOR L (FACTRL) - Suspicious.

23. IPAT FACTOR M (FACTRM) - Imaginative.

24. IPAT FACTOR N (FACTRN) - Shrewd.

25. IPAT FACTOR O (FACTRO) - Apprehensive.

26. IPAT FACTOR QI (FACTQ1) - Experimenting.

27. IPAT FACTOR Q2 (FACTQ2) - Self-Sufficient.

28. IPAT FACTOR Q3 (FACTQ3) - Controlled.

29. IPAT FACTOR Q4 (FACTQ4) - Tense.

30. IPAT SECOND ORDER EXTRAVERSION. (FACT2E) - Extraversion.

31. IPAT SECOND ORDER ANXIETY (FACT2A) - High Anxiety.

32. IPAT SECOND ORDER TOUGHMINDEDNESS (FACT2T) - Toughminded.

iv) Post College Success.

33. PHYSICAL EDUCATION PROMOTION (PEPROM) - Data were collected from College I files relating to physical educationists who left college ten to twenty years ago, viz. their college assessments in: personality interview, practical interview, teaching marks, "method" examinations, anatomy examinations, physiology examinations, "principles" examinations, practical physical education, and overall final assessment in physical education.

34. REJECTED PHYSICAL EDUCATION STUDENTS' SUCCESS (PERJCT) - Questionnaires (Appendix C) were sent to all physical education students rejected by College I after interviews in 1965, 1966 and 1967. Details were obtained of their education and employment since their rejection.

35. REJECTED ACADEMIC STUDENTS' SUCCESS (ACRJCT) - Questionnaires (Appendix C) were sent to all academic students rejected by College I in 1965, 1966 and 1967 after interviews. Details were obtained of their education and employment since their rejection.

3.6 THE PREPARATION OF THE DATA FOR COMPUTATION.

Parametrics or Non-Parametrics?

The view has been stated that frequently parametric techniques are used erroneously because the researchers are under the impression that they should be used in preference to non-parametric techniques which it is thought are far weaker. It has been further claimed that non-parametric techniques should be used particularly in the behavioural sciences because of the problem of ensuring that one's sample is drawn from a "normally distributed" population (Siegel, 1956).

Other statisticians are not convinced of the validity of Siegel's argument. For instance:

> "Siegel's text emphasizes which statistical techniques are 'appropriate' to which scales of measurement. Although a useful text in many respects, its emphasis on 'permissible' and 'appropriate' statistics is perhaps misplaced". (Glass and Stanley, 1970, page 13).

Some have no doubts about which techniques to use:

> "when there is any choice, therefore, we should prefer a parametric test, except where a quick, rough test will do". (Guilford, 1965, page 252).

While some place less emphasis on the need for normal distribution in parametric techniques, and refer to the suitability of their use when the populations:

> "are distributed in an <u>approximately</u> normal fashion". (Popham, 1967, page 270).

and:

> "statisticians generally agree that when the researcher is working with data which seriously violate the parameter assumptions required by appropriate parametric tests, non-parametric procedures are suitable alternatives". (Popham, 1967, page 270).

Additionally Popham points out that often the debate confuses a "measurement" question with a "statistical" one and he goes further by stating that:

> "a number of empirical studies have demonstrated that, when parametric procedures have been employed with ordinal data, they rarely distort relationship between variables which may be present in the data. More often than not, such parametric analysis results are nearly identical to those yielded by non-parametric procedures. Since the majority of data encountered in educational research probably falls somewhere between ordinal and interval strength, the educational researcher is usually on safe grounds when he applies parametric tests to numerical (ordinal or interval) data". (page 273).

In this study it was considered that both parametric and non-parametric techniques would need to be used. In the first instance, parametric procedures have been used where it was considered that the nature of the data warranted it, and secondly the less accurate non-parametric methods were employed where colleges' scoring did not satisfy the assumptions underlying the use of parametric techniques.

Statistical Techniques.

In the cases where the data were prepared so that correlation coefficients could be computed, there was a need to examine more closely how the resultant figures would be interpreted. In view of the discrepancies that would be created by combining scores allocated by different college lecturers under the heading of the same assessment, no attempt was made to take the further step of using factor analysis. For with large numbers of variables or measures of students' abilities, common factors might have emerged showing relationships between variables, and it was felt that this would be an "artificial" procedure which might accidentally have produced a significant result. A number of dangers using the factor analysis technique in studies such as this, and of reading too much into the correlation coefficients used in factor analysis have been outlined (Child, 1970; Rosenshine, 1971). Users of factor analysis have been said to "struggle and struggle and struggle" (McNemar, 1951, page 353) to fit the factors to their hypotheses.

Another possibility was to use the multiple-regression prediction technique, but it has been pointed out that by adding another prediction variable:

> "to form a multiple regression scheme we shall have added relatively little to the power and accuracy of the prediction formula..(if)..both predictor variables are doing the same job". (Popham, 1967, page 111).

In this research, headmasters, academic ability assessors and personality assessors made subjective judgements and had in mind the same eventual product, a qualified teacher, but their assessments were not linked to the outcome in a one-examination teaching certificate, but they were attempting to predict an outcome under the separate criterion variables,

i.e. teaching marks, education theory marks, etc. In a similar investigation, it was found that:

> "little practical insight was to be gained by the use of multiple correlation of the various levels of professional data in estimating a professional level some time later. In not one instance did the R appear to be significantly better than the r with a single variable - and sometimes it was insignificantly smaller than the r with another non-professional variable, i.e. age or sex". (Start, 1966, page 28).

In yet another study, between two and forty-two variables were used as predictors of ability in Practice of Education and multiple correlations were obtained varying from 0.08 to 0.65. Only seven correlations were significant at the 1% or 5% levels, whereas with the numbers involved, five could have been expected by chance to be significant! It was concluded that volumes of research involving hundreds of tests on teachers' abilities were not likely to be very valuable unless the research were to be confined to a few significant common factors (Warburton et. al., 1963).

It was decided therefore that in this study, Pearson product-moment correlation coefficients, simple regression equations, standard error of the estimate and the t - test would be the principal techniques to be used. Thus in addition to the nature of the relationships between various measures of student performance being available, the strength of these relationships would also have been calculated. Where the data collected did not satisfy the conditions necessary to compute a Pearson r, the chi-square technique was used to determine the nature of the relationships between student scores on various variables.

Levels of Significance.

In a longitudinal study, the process of selection and assessment of students could be more accurately described and tested by eliciting from the headmasters and colleges' staffs their precise objectives and criteria. However, in this study, not all of the headmasters could be contacted and not all of the staff who interviewed or assessed the students were still members of those colleges, thus it was not possible to ascertain whether or not actual objectives were realised. Therefore, one was looking for relationships among the various grades obtained by students to observe if any were strikingly more significant than could have occurred by chance, and no attempts were made to indicate that these were necessarily causal relationships.

It was necessary therefore first of all to decide upon levels of significance to be used in the testing of the hypotheses. Normally, in this kind of study they are set at the 5% or 1% levels, and the merits of using these were considered. Table 6 illustrates the differences between accurate prediction procedures and the results which would have been obtained by purely random selection. It also serves as a reminder of what exactly is meant by a hypothesis being accepted at the 5% or 1% level of significance. In the first instance it means that the "probability" is that the chance of the situation being spurious is less than one in twenty or less than one in a hundred respectively.

TABLE 6.

Accuracy of prediction scores at different levels of significance.

(a) n = 200

CORRELATION COEFFICIENT		0		0.14 (sig. 5%)		0.18 (sig.1%)		1.0	
		Colleges' Final Course Assessments.							
		High	Low	High	Low	High	Low	High	Low
INTERVIEW ASSESSMENTS	HIGH	50	50	57	43	59	41	100	0
	LOW	50	50	43	57	41	59	0	100

(b) n = 100

CORRELATION COEFFICIENT		0		0.20 (sig. 5%)		0.25 (sig. 1%)		1.0	
		Colleges' Final Course Assessments.							
		High	Low	High	Low	High	Low	High	Low
INTERVIEW ASSESSMENTS	HIGH	25	25	30	20	31	19	50	0
	LOW	25	25	20	30	19	31	0	50

(The objective of selection procedures is to maximize the HIGH/HIGH cells (right decisions) and to minimize the HIGH/LOW and LOW/HIGH cells (wrong decisions)).

Referring to Table 6(a) it will be seen that if a college normally interviewed 200 students for admission to 100 places on courses in any one year, should the staff randomly select 100 students from the list of applicants in lieu of actually interviewing them and took these 100 students as being the best 100 for admission to the college and the remaining 100 as being those to whom no place would be offered, there is every likelihood that 50 of the selected 100 would turn out to be students

to whom places should have been offered and that 50 of these rejected would also have been in terms of ability in the top half of the 200; this is known as a correlation of 0.

Such methods are insufficiently accurate for colleges, therefore they employ time-consuming, expensive procedures of interviewing to ensure that fairer results are obtained. Ideally, the colleges would aspire to a situation in which all of the 100 selected would complete their courses in a more satisfactory fashion than would the 100 rejected (i.e. a correlation of 1) but there is no way of checking what the performances would have been of the rejected students. However, one can check the relationship between the interview scores of students and their colleges' assessments at the end of their courses, thus checking whether or not the high interview scores do predict high college achievements. If this were found to be so, say at the 1% level of significance, this would mean that only 9 students extra to the randomly selected 50 would have been chosen by the colleges' elaborate interviewing procedures.

If we refer to Table 6(b), i.e. say a large physical education department intake of 100 students in a year, the complicated procedures involving extra practical physical activity tests in gymnasia would result (at the 1% level of significance) in only 6 additional students to a randomly selected 25 being accurately selected. Therefore throughout this study, the resultant correlations will be discussed in relation to their greater effect than those which would have been obtained by chance.

Standardisation of the Scoring.

For the purpose of interpretation, there was a need first of all to arrange the data collected into a form that would facilitate ease and accuracy in computation, so that a study could be made of the nature of the relationships that existed among the different measures of the ability of both physical education and academic students in all of the colleges.

A mixture of literal grades and percentage scores were contained in the colleges' records (Appendix B) and this posed the problem of whether or not to use a mixture of literal and percentage scores, or to convert all to one or the other. Statisticians (e.g. Popham, 1967, page 273) seem to regard this as no difficulty. However, an Olivetti 101 desk computer check was carried out on a randomly selected number of inter-relationships from the colleges' data and Pearson product-moment correlations were calculated from both percentage scores and the literal grades (converted to numerals). Additionally, the chi-square technique was applied to the same data to compare the levels of significance of the resultant relationships.

TABLE 7.

Comparison between correlations of the percentage and converted literal scores of students in randomly selected variables.

COLLEGE	NO. OF STUDENTS	VARIABLES	CORRELATIONS			χ^2 VALUE
			BOTH NUMERICAL SCORES	1 NUMERICAL & 1 LITERAL SCORES	BOTH LITERAL SCORES	
III	158 PE	6 v. 10	** 0.28		** 0.27	** 12.54
I	165 AC	6 v. 8	** 0.431		** 0.433	** 16.69
IV	62 AC	7 v. 10		n.s. 0.1071	n.s. 0.1072	n.s. 0.13
X	117 PE	6 v. 9	n.s. 0.0451		n.s. 0.0403	* 5.43
VI	191 PE	4 v. 5	** 0.431		** 0.434	** 19.58
III	76 AC	1 v. 10		n.s. 0.02	n.s. 0.01	n.s. -0.00
II	104 AC	2 v. 9		* 0.25	* 0.24	* 6.21
V	81 PE	3 v. 5		n.s. 0.014	n.s. 0.018	n.s. 0.27
VIII	65 PE	5 v. 10		n.s. 0.2242	n.s. 0.2241	n.s. 3.15
III	76 AC	6 v. 10	** 0.39		** 0.34	** 6.79

n.s. - not significant

* - significant at the 5% level

** - significant at the 1% level

AC - Academic Students

PE - Physical Education Students

The results of this analysis (shown in Table 7) indicate a high measure of agreement in the decisions arrived at, using numerical equivalents of literal grades, percentages and a combination of these two methods of assessing students' abilities. This indicated that a conversion to numerical scores of all literal grades would not detract from the accuracy of the computations, but it also highlighted that it would be inappropriate to use parametric techniques with the nature of the data collected from College X (and also Colleges VII, VIII and IX).

Accordingly the colleges' assessments of students were all converted to literal grades using the individual colleges' conversion methods, and the literal grades were then converted to numerical scores thus:

Grade A - Score 5

Grade B - Score 4

Grade C - Score 3

Grade D - Score 2

Grade E - Score 1

In the case of the G.C.E. 'A' level examination results of students which were included in the records of some of the colleges, numerical scores were allocated after reference to Statistics in Education, Vol. 4, H.M.S.O., 1968, an extract from which appears in Table 8.

TABLE 8.

The entrance qualifications of men students admitted to three-year courses of initial training in England and Wales.

NO. OF G.C.E. 'A' LEVEL PASSES.	1965 INTAKE	1966 INTAKE	1967 INTAKE
0	1969	2408	2419
1	1923	2254	2267
2	1869	2013	2207
3+	1000	1166	1220
"OTHERS"	592	723	899

Thus the scoring for achievements in the G.C.E. examinations was organised as follows:

3 or more G.C.E. 'A' level passes	-	5
2 passes	-	4
1 pass	-	3
No 'A' level passes but at least 5 'O' levels	-	2
No G.C.E. qualifications	-	1

Computers.

The data collected (Appendix B) were examined using statistical techniques appropriate to the testing of the different hypotheses. The computers used were the City of Leeds and Carnegie College on-line link to the City of Leeds I.C.L. 1904A computer, the University of Aston I.C.L. 1906A computer, and an Olivetti 101 desk computer. Special computer programmes were designed by the author (Appendix E) using three main texts for the statistical formulae (Guilford, 1965; Popham, 1967; Siegel, 1956) the full details of which appear in Appendix D.

The results of the computations appear in Chapter Four.

CHAPTER FOUR.

RESULTS.

"Errors, like straws, upon the surface flow;
He who would search for pearls must dive below".

DRYDEN, All our Love, Prologue.

4. RESULTS.

As indicated in the section on the design of the investigation, the general method of treatment of results was to compute correlation coefficients, t values and chi-square values between a number of measures of student performance:

(a) those measures used as a basis for selection for entry to the colleges,

(b) the final assessments of students at the end of the three-year course,

(c) students' subsequent career performances,

and (d) students' personality as measured by Cattell's 16.P.F. questionnaire.

Table 9 summarizes the general findings relating to:

(a) the efficiency of the selection measures,

(b) the predictive value of the selection measures and the final course assessments for future job success,

and (c) the personality traits associated with success at colleges of education.

Statistically significant coefficients, t and chi-square values indicate significant relationships between the various student measures, to the extent that if the number of significant relationships are not high, then the hypotheses cannot be regarded as having been sustained, and in particular the selection measures and final assessments must be regarded as having little validity.

TABLE 9.

The number of cases in which the hypotheses were sustained at a level of significance of 5% or better. (e.g. 4/7 represents 4 cases in which the hypothesis was accepted out of a possible total of 7).

HYPO-THESIS	COLLEGES. I	II	III	IV	V	VI	VII	VIII	IX	X	OVER-ALL
1	4/7	3/7	3/6	n.t.	2/7	n.t.	n.t.	n.t.	n.t.	n.t.	12/27
2	6/34	6/34	3/12	3/21	1/20	4/8	4/4	0/8	0/3	0/4	27/148
3	18/38	28/38	6/6	5/9	9/12	4/6	6/6	0/6	1/3	3/6	80/130
4	4/9	3/9	4/6	3/7	3/8						17/39
5	7/15										7/15
6	7/9										7/9
7	33/179										33/179

n.t. - not tested.

Referring to Table 9, it will be observed that:

(a) in only 12 cases out of 27 selection measures at 4 colleges were students' G.C.E. 'A' level attainments significantly related to the students' potential as assessed by headmasters and colleges' interviewing tutors - this suggests that features other than students' academic ability were being taken into account when their potential as teachers was being estimated;

(b) out of 148 cases only 27 showed that the selection measures had any predictive value in respect of the criterion (the number of measures differed among the 10 colleges, the maximum number of selection measures being 3, the maximum number of final assessments being 8);

(c) in 80 out of 130 cases (involving a maximum of 5 final assessments for academic students and 8 for physical education students at 10 colleges) significant relationships existed between students' achievements in the colleges' final assessments - suggesting that students obtaining a high grade in one subject in a college examination tended to obtain high grades in the other subjects;

(d) out of 39 student measures in 5 colleges, there were only 17 significant differences between the mean grades achieved by physical education students compared with students of other subjects;

(e) at 1 college, in 7 out of 15 cases (5 college examination scores X 3 personality scores), significant relationships were seen to exist between physical education students' high scores in their final physical education exams and high scores on personality traits measuring Extraversion, Stability and Toughmindedness;

(f) significant differences were observed between the college examination results of former students who were still teaching ten to twenty years after leaving College I compared with those former students who became lecturers and inspectors; the lecturers and inspectors achieved significantly higher scores in 7 out of 9 college final examinations;

(g) only 33 out of 179 candidates rejected by College I failed to complete successfully courses at other institutions of higher education.

It is now necessary to examine these results in more detail and to consider more carefully both the nature of the data and the statistical procedures used to test the hypotheses. This chapter will therefore be divided into eight sections relating to each of the seven hypotheses and an overall summary. Each section begins with the statement of the hypothesis, then follow summaries and/or graphs of the details of the primary data collected to test the hypothesis. Next, there is discussed the statistical treatment that it was considered appropriate to use to test the hypothesis with the data that was available. Finally, the evidence is produced upon which the statistical decision was taken to reject or to accept the hypothesis, and there is a brief discussion of the findings in relation to the colleges as a whole.

The interpretation of the findings in relation to the individual colleges appears in Chapter Five, for though many generalisations can be made about the selection procedures and methods of assessment in the colleges, Table 9 highlights one of the main findings of this study - that colleges differ considerably, though ostensibly their main function is the same, the training of teachers.

4.1 HYPOTHESIS 1.

In Britain, the only national guide to secondary-school pupils' intellectual ability is their attainment in the G.C.E. 'O' and 'A' level examinations, and though this is used by universities in the consideration of candidates' suitability for their courses, colleges of education do not consider this sufficiently accurate to be the sole guide used in the selection of teacher-training students.

The candidates for places at the colleges of education used in this research had two main obstacles to overcome before they were offered college places; first, their school records, written applications and references needed to be sufficiently impressive to warrant the colleges' offering the candidates interviews, and secondly, the candidates needed to perform well during the various interviews at the colleges.

The colleges used the headmasters' references as guides to candidates' potential as teachers, and the candidates' G.C.E. 'A' level attainment as a guide to candidates' intellectual abilities. On appearing at interviews, however, candidates' teaching potential and intellectual abilities were then assessed subjectively by the colleges' staffs during "personality" interviews and "academic" ability interviews respectively. Hypothesis 1 was based on the assumption that one might therefore expect to find significant positive relationships between those variables which supposedly measure the same ability. (In the case of the practical physical education interviews, these were used as a guide to students' potential in games etc. and it was not expected that they would necessarily be related to the other pre-college entrance grades).

This hypothesis states that students who have obtained high G.C.E. 'A' level examination success are rated more highly by their headmasters and are awarded higher grades at the college interview than students who have lower 'A' level success.

Table 10 shows the numbers of students achieving High G.C.E. 'A' level attainment (two or more passes) and Low G.C.E. 'A' level attainment (one pass or less) who were rated High (Grades A and B) and Low (Grades, C, D and E) when the headmasters' and interviewing tutors' grades were combined and averaged. Full details of the G.C.E. attainment, headmasters' and interview ratings appear in Appendix B.

TABLE 10.

Relationships between G.C.E. 'A' level attainment and the prediction of students' potential at four colleges, indicated by the number of times high G.C.E. achieving students obtain high grades from headmasters and college interviewers.

(Agreement between G.C.E. attainment and headmasters' and interview ratings is indicated by the frequency in each case in the categories (High/High) + (Low/Low). Disagreement is indicated by the frequency of the categories (High/Low) + (Low/High). e.g. All Students Total (High/High) + (Low/Low) = 224 + 319 = 543 (High/Low) + (Low/High) = 269 + 163 = 432).

(a) Physical Education Students.

		G.C.E. 'A' LEVEL ATTAINMENT									
		COLLEGES									
		I		II		III		V		TOTAL	
		HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES
HEAD MASTERS' RATINGS & INTVW. GRADES	HIGH SCORE	53	47	33	43	30	83	6	17	122	190
	LOW SCORE	14	24	9	21	13	32	11	47	47	124
	n	138		106		158		81		483	

TABLE 10 contd.

(b) Academic Students.

HEAD MASTERS' RATINGS & INTVW. GRADES	HIGH SCORE	33	33	32	15	19	19	18	12	102	79
	LOW SCORE	42	57	25	32	9	29	40	77	116	195
	n	165		104		76		147		492	

(c) All Students.

HEAD MASTERS' RATINGS & INTVW. GRADES.	HIGH SCORE	86	80	65	58	49	102	24	29	224	269
	LOW SCORE	56	81	34	53	22	61	51	124	163	319
	n	303		210		234		228		975	

Statistical Treatment.

The method chosen to test the significance of these results was that of the product-moment correlation. It is to be expected that scores or grades which purport to be measures of the same abilities (e.g. G.C.E. 'A' level passes and Academic Interview Ratings) should show significant levels of correlation over the student population for whom data were obtained.

For each college, correlation coefficients were calculated between students' scores on each of the five variables - Headmasters' ratings, G.C.E. 'A' level results, and the college interview ratings for the Academic, Personality and Practical abilities respectively. These coefficients were averaged by Fisher z transformations to produce the matrices of intercorrelations shown in Table 11. Results are shown separately for physical education and academic students.

TABLE 11.

Relationships among various pre-college entrance ratings of students at six colleges.

(a) Physical Education Students (n = 804).

	Correlation Coefficients (Decimal points omitted).				
PRE-COLLEGE ENTRANCE RATINGS.	H/M RATINGS	G.C.E. 'A' LEVELS	ACAD. INT.	PERS. INT.	PRAC. INT.
H/M RATINGS.					
G.C.E. 'A' LEVELS.	11				
ACAD. INT.	15	23**			
PERS. INT.	11	04	18*		
PRAC. INT.	06	-02	-05	24**	

(b) Academic Students (n = 554).

H/M RATINGS.					
G.C.E. 'A' LEVELS.	11				
ACAD. INT.	15	38**			
PERS. INT.	16	15	25**		
PRAC. INT.	-02	n.d.a.	-01	09	

(c) All Students (n = 1358).

H/M RATINGS					
G.C.E. 'A' LEVELS	11				
ACAD. INT.	15	31**			
PERS. INT.	13	09	21**		
PRAC. INT.	04	n.d.a.	-03	22**	

n.d.a. - no data available.

* - significant at the 5% level.

** - significant at the 1% level.

Statistical Decision.

These results, taken in conjunction with the frequency table (Table 10) indicate firstly, that headmasters' ratings of teaching potential show no tendency to favour students with high grades at 'A' level examinations. It appears to be the case that headmasters take into account features other than intellectual ability when attempting to estimate students' potential as teachers of either physical education or other subjects.

Secondly, the results indicate that students with high grades at 'A' level are rated more highly in their academic interviews but that these bear no relationship to their ratings for 'personality' and 'practical ability' respectively.

Thirdly, the results show that similar ratings are obtained by students in their 'personality' and 'academic' interviews.

Discussion.

There appears to be both redundancy and inconsistency in the methods used to select students for places at the colleges of education. Headmasters' ratings of teaching potential are supposedly taken into consideration and yet they bear no relation to the colleges' own interview assessments - i.e. they are inconsistent with college ratings. On the other hand, the fact that the academic interview yields only confirmatory evidence of 'A' level grades, while the personality and practical interviews are not independent of one another suggest that at least two of the interviews are 'surplus to requirements', i.e. redundant.

Though correlation matrices may emphasise the value of the separate pre-college entrance grades, they only present a part of the picture of the whole process of the selection procedures that evolved during the

visits to the colleges in the data collection:

> "Two of the most startling things to emerge during the initial collection of the data for the survey were the differences in the information required by individual colleges and the degree of retention of such information by these institutions".
>
> (K.B.Start, 1967, page 6).

In this present enquiry, one also observed different requirements and details of applicants by different colleges. Some of the criteria for selection were hinted at in the college brochures, e.g. some of the church colleges, though not requiring candidates to be able to demonstrate that they were regular churchgoers, did stress that morning chapel was a feature of the colleges, that sympathy to the beliefs of the church would be an advantage to candidates and that where possible candidates should nominate a member of the clergy as one of their referees. There were other criteria exclusively used by colleges or by departments within colleges, but unfortunately, candidates were not always aware of them.

As the interview procedures were lengthy, costly and disruptive of the normal college routine, one could expect that the colleges were confident of the reliability of their procedures and the validity of selecting candidates who had satisfied their requirements while rejecting candidates who did not satisfy them. However, though the information required for this study was reasonably recent (that is all candidates entered the colleges within the six years prior to the initiating of this research), retention of such records was often haphazard or non-existent. Additionally, the later use of such information as the pre-college entrance grades as a check of the accuracy of the colleges' assessments and predictions was not a feature of any of the colleges.

One of the unfortunate aspects of the situation was that seventeen-year old young men at schools throughout the country were not really aware, when selecting the colleges, that the interviewing procedures and criteria for selection differed from college to college. It might well have been of some assistance to schools' careers masters and the candidates if:

a) the nature of the interviews and criteria for selection had been stated on the application forms,

and b) on being rejected, the candidates had been informed of their main weaknesses.

In some cases, too, candidates will have had a number of interviews in different parts of the country before eventually being offered a college place. The cost to the children or their parents, the mental anguish of many rejections, and the occupying of so much time of colleges' staff lead one to believe that if colleges' tutors were confident that there was a need to take a step further than an examination of candidates' G.C.E. attainment and headmasters' reports, then <u>one</u> interview would have been sufficient, the <u>full report and grades</u> from which could have been made available for the candidate, his school and any other colleges for which he had applied. However, if there were to be but <u>one</u> interview, then the results would be final, and as the selection process and the criteria are idiosyncratic for each college, it may well be at present that having only <u>one</u> interview would place many students at a disadvantage. A need is therefore highlighted for further investigation and consideration of this problem.

In summary, the evidence of this study indicates that:

1. Headmasters' Reports on the suitability of

candidates for teaching appear to be almost entirely disregarded in the selection procedures in spite of protestations about their being 'taken into consideration',

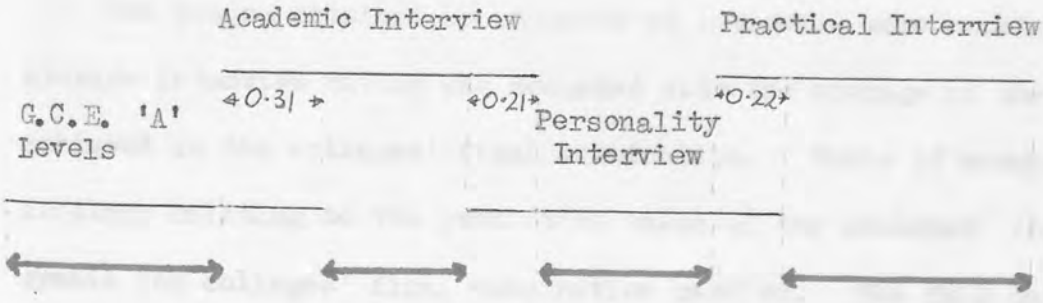
2. the Academic Interview merely confirms what is already known about the applicant from his G.C.E. 'A' levels,

3. the Personality Interview merely confirms what the Academic Interview has discovered,

and 4. the Practical Interview merely confirms the results of the Personality Interview.

It is, however, the case for example that the Academic Interview does not correlate with the Practical Interview, though both correlate with the Personality Interview. Only Factor Analysis could tease this one out - but one is not justified, therefore, in saying that any of the interviews are <u>entirely</u> redundant.

The picture appears to be represented by the diagram below:



Figures represent correlation coefficients between the student measures. Red lines represent the unique contributions of a part of the four measures <u>OR</u> the part that is ignored.

However, the picture does vary from college to college and the colleges would no doubt argue that this indicates that the selection procedures serve the function of directing the student to the educational institution which is mutually best for applicant and college.

4.2 HYPOTHESIS 2.

Considering the problems in the organisation and the time and the expense involved in interviewing candidates for places at colleges of education, it could be assumed that the colleges placed great faith in the accuracy of their selection procedures, especially when taking into account the fact that details of candidates' school and extra-curricular activities, G.C.E. examination results and the headmasters' reports and assessments of the candidates' potential as teachers were also available to the colleges. Hypothesis 2 was therefore based on the assumption that those students with the high pre-college entrance grades, and in particular the high interview marks, were more likely to obtain high grades in their studies during their college three-year course.

Hypothesis 2 states that students who have obtained high interview ratings are more successful in college final examinations than students who have obtained low interview ratings.

The grades obtained by students at interview were combined and the average interview rating was compared with the average of the ratings achieved in the colleges' final examination. Table 12 summarizes the findings relating to the predictive value of the colleges' interview grades for colleges' final examination results. The full details appear in Appendix B.

TABLE 12.

Relationship between students' interview grades and their final college assessments at six colleges.

(a) Physical Education Students.

		INTERVIEW GRADES.													
		COLLEGES.													
		I		II		III		IV		V		VI		TOTALS	
		HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES
FINAL COLLEGE ASSESS-MENTS	HIGH SCORE	42	40	39	30	46	8	28	7	3	21	45	24	203	130
	LOW SCORE	20	36	22	15	70	34	81	14	9	48	66	56	268	203
	n	138		106		158		130		81		191		804	

(b) Academic Students.

FINAL COLLEGE ASSESS-MENTS	HIGH SCORE	34	39	34	29	18	3	7	3	16	47			109	121
	LOW SCORE	49	43	18	23	35	20	32	20	16	68			150	174
	n	165		104		76		62		147				554	

(c) All Students.

FINAL COLLEGE ASSESS-MENTS	HIGH SCORE	76	79	73	59	64	11	35	10	19	68	45	24	312	251
	LOW SCORE	69	79	40	38	105	54	113	34	25	116	66	56	418	377
	n	303		210		234		192		228		191		1358	

High Score - Grades A and B.

Low Score - Grades C, D and E.

Agreement between interview grades and final college assessments (High/High) + (Low/Low), 312 + 377 = 689

Disagreement between interview grades and final college assessments (High/Low) + (Low/High), 251 + 418 = 669

Statistical Treatment.

(a) The Relationship between Interview Grades and Colleges' Final Assessments.

It was decided that the data, in which there were up to five student measures which the colleges were using to predict students' performances in up to eight college assessments, required a simple regression treatment. From this, one could obtain product-moment correlation matrices, regression equations and the standard error of the estimate. Thus there would be available not only the relationship between measures of student performance, but also the strength of the relationships between the predictor variables and criterion variables. Additionally the multiple correlation formula was written into the programme to establish whether incidentally a relationship existed between two predictor variables and any of the criterion variables.

In the case of the colleges where the data collected did not satisfy the conditions necessary to compute a Pearson r, the chi-square technique was used. The literal grades were grouped so that relationships between two variables could be calculated by means of the four-cell chi-square computations, that is grades A and B performances were grouped together as the "High Score" and C and D performances were grouped together as the "Low Score". Students obtaining E grades (failures) were not always included in the colleges' "pass lists". However, they did occur very infrequently and were classified along with the "Low Score" students. The results of the chi-square calculations are discussed under the separate headings of the colleges in Chapter Five.

All the statistical formulae used appear in Appendix D, and the computer programmes especially written for this research appear in Appendix E. The computer print-outs of the calculations related to Hypothesis 2 are in Appendix F and the resultant coefficients have been

TABLE 13.

Relationships between the interview ratings and the final college assessments obtained by students at six colleges.

(a) Physical Education Students (n = 804).

	Correlation Coefficients (Decimal points omitted).		
STUDENT RATINGS	ACAD. INT.	PERS. INT.	PRAC. INT.
EDUCATION	09	05	-04
TEACHING	07	05	08
ENGLISH	17	10	-11
SUBSIDIARY SUBJECT	16	-10	-08
MAIN SUBJECT	-08	04	03
P.E. THEORY	10	-04	-16*
P.E. DISSERTATION	06	-04	-07
P.E. PRACTICAL	-04	11	08

(b) Academic Students (n = 554).

			(Handicraft skill).
EDUCATION	15	19*	-15
TEACHING	15	09	25*
ENGLISH	07	17*	n.d.a.
SUBSIDIARY SUBJECT	07	04	n.d.a.
MAIN SUBJECT	08	08	44**

(c) All Students (n = 1358).

EDUCATION	12	11	-04
TEACHING	10	05	10
ENGLISH	12	14	-11
SUBSIDIARY SUBJECT	11	-04	-08
MAIN SUBJECT	02	05	09

n.d.a. - no data available.
* - significant at the 5% level.
** - significant at the 1% level.

averaged using the Fisher z transformations to produce the matrices of intercorrelations shown in Table 13.

(b) Testing the Reliability and Validity of the Practical Interview Tests at College I.

The scores which the students at College I achieved during their practical tests prior to entering the college were available in percentages. Additionally, permission was obtained to re-test any students, therefore it was decided to re-test those students who entered the college in 1965, 1966 and 1967 with the identical practical tests that had been used at their interviews. This enabled a further, more specific, examination to be made of relationships between interview grades and college final assessments.

The obvious statistical tool to test the reliability of the practical interviewing procedures was the Pearson product-moment correlation, with means and standard deviations also compared (Table 14). In view of the fact that the interview test was used by the college partly as a predictor of students' practical games etc. ability, the scores obtained by the students for their practical ability in games etc. in their college final examinations were converted to an aggregate percentage score. By means of the Pearson product-moment correlation, it was possible to test the validity of the practical interview procedures as a predictor of success in the college practical games etc. course. The low correlation coefficient obtained did not warrant a regression treatment.

Details of the results appear in Table 14.

TABLE 14.

Correlations, means and standard deviations of physical education students' scores on various practical activity tests (a random sample - 33% of the total populations of three different three-year course groups at College I, n = 55).

	INTERVIEW PRACTICAL TESTS.	INTERVIEW PRACTICAL RE-TESTS 3 YEARS LATER.	COLLEGE FINAL EXAMINATION FOR PRACTICAL ABILITY.
MEAN SCORES	68.51%	68.18%	63.5%
STANDARD DEVIATIONS	9.93	11.35	7.56
r WITH INTERVIEW PRACTICAL SCORES	1		
r WITH INTERVIEW RETEST SCORES	** 0.37	1	
r WITH FINAL PRACTICAL EXAM SCORES	n.s. 0.15	n.s. 0.07	1

** - significant at the 1% level.

n.s.- not significant.

Statistical Decision.

The results indicate in the first instance that the hypothesis that students who obtained high interview ratings were more successful in college final examinations than students who obtained low interview ratings was not sustained for physical education students. The only significant relationship between interview and final examination ratings was a negative one! It appears to be the case that students who obtained high grades at the practical interview were likely to obtain low grades in the college final physical education theory examinations (Table 13a). Additionally, Table 14 indicates that the students' practical interview ratings were not significantly related to students' final practical physical education examination results.

Secondly, significant relationships were observed between the interview ratings and final examination results of the academic students. However, though students obtaining high personality interview ratings were likely to obtain high ratings for education and English courses, they did not achieve high ratings for teaching (for which purpose the personality interviews were designed). The practical interviews for academic students were confined to one college where the 'academic' students were all studying handicrafts, therefore the results cannot be regarded as representative of either a number of colleges or a number of academic subjects.

Thirdly, overall the hypothesis appeared to be untenable, for Table 13c shows that not only were there no significant correlations among the fifteen interrelationships between interview and college final examination ratings, but four of them were negative! It is concluded therefore that colleges' interview ratings were not accurate predictors of students' performances in the colleges' final examinations.

Discussion.

The colleges' interview ratings do not appear to be valid predictors

of students' college performances. Academic interviews were designed to predict students' academic ability, but there were no significant relationships between students' academic interview ratings and their performances in any of the college examinations. The personality interviews were supposedly intended to differentiate between potentially good and not-so-good teachers, yet neither the physical education nor the academic students' personality interview ratings were significantly related to their teaching marks.

In the case of the practical interviews, the physical education students' practical ratings were not related significantly to any of their college performances, except in one case - a negative relationship with students' physical education theory examination results, that is the best practical performers at interview were the least likely to obtain high grades in the theory examinations. A number of implications result from this finding, not the least important being that many well-qualified students were rejected by colleges as a result of poor performances at practical interviews, yet theoretically they might have performed very well in the physical education theory examinations if they had been accepted! The significant relationships between academic students' practical interview ratings and their ratings at teaching and main subject examinations were confined to one college and one subject, handicrafts. In this instance it would appear that handicraft skill was pre-eminent in the minds of handicraft lecturers when they assessed their students.

Many years ago it was stated that:

> "selection procedures must be compared with some measures of occupational performance".
>
> (Farmer, 1934, page 52).

It was also suggested that before the final examinations were used to

validate course selection procedures, a further step should be taken, that of discovering:

> "how far the final examination is a criterion of occupational proficiency".
>
> (Farmer, 1934, page 52).

Forty years later it would appear that these suggestions have not been incorporated into teacher-training courses, though there seems to have been some awareness of a need for change. One suggestion that has been made is that interviews have been the opportunities for a college to select those students which it could train (Evans, 1959). However, if the high interview grades of the colleges used in this present research were intended to be related to the excellence of the students, then the examination results do not seem to have reflected that excellence. One could also argue that in view of the teacher shortage during the time of these interviews, such a small proportion of qualified students in England and Wales were not placed in colleges of education that the interviews described here could be regarded as an expensive ritual. The cost of the interviewing procedures throughout England and Wales has been estimated at £680,000 (Start, 1968), or in a college the equivalent of one academic member of staff's time in a whole year allocated to interviewing procedures (excluding academic registrar's efforts, other clerical time, and the time spent reading the applications!)

One of the problems related to selection procedures is that they have always been done, and that colleges appear to expect to continue to use them. A rational consideration of the facts might suggest for instance that headmasters' assessments can vary in their value, and one potential history student obtaining a 'B' grade from a headmaster of a mixed secondary-modern school cannot really be compared with a potential chemistry

student obtaining a 'C' grade from the headmaster of a grammar school for boys. Yet frequently the grade is placed on a student's college interview form with no details of the school or the headmasters' comments, as though the grade alone was indicative of something in particular.

Similarly, G.C.E. 'A' level results need closer examination, for some colleges normally expected students simply to have obtained one or two 'A' level passes. The number of attempts the students had in obtaining them often appears to have been regarded as irrelevant by the tutors, as was the amount of help the students obtained at the school and home, any difficulties students had to overcome, and the relevance of the subjects passed to the students' future teaching careers.

Not being sufficiently confident in the accuracy of the headmasters' assessments and G.C.E. attainment, the colleges did take the further step of extending the selection procedures perhaps to attempt to eliminate any of these described inaccuracies. But they often appear to have fallen into a trap of ignoring the fact that by using a variety of different staff on the academic and personality interviews, there was no resultant "norm" in the grades awarded. Yet a student may have been rejected one day on the basis of his having obtained low grades at interview, whereas if he had been interviewed the previous day, a different college tutor might have subjectively assessed him at a higher grade.

Similarly, the possibility of inaccuracies in the practical tests for physical education students should be considered, even though the colleges may well have attempted to standardise their scoring. It would appear that the nature of the students' clothing and footwear may have affected some of the tests used, but this seemed not to have been taken into account. The fact that the students may have travelled overnight, or two hundred miles that day was another factor that could have affected his performance on the physical tests, but this was ignored. Also the nature of the candidate's school physical education programme may have been an

advantage to some and a distinct disadvantage to others.

The Department of Education and Science is at present considering the future role of colleges of education, and has intimated that throughout higher education future candidates may be persuaded to opt for courses at institutions nearer their homes. If this became a popular notion, then teacher-training candidates may well be saved some expense by having their interviews confined to institutions nearer their homes. Many educationists would suggest that the colleges could also save money themselves by reducing or omitting altogether the requirement for all potential teachers to attend interviews prior to their being offered places at colleges of education, especially in view of the unreliability of the interviewing procedures that have been shown to exist by this and other studies.

4.3 HYPOTHESIS 3.

Though the colleges required students to pass up to eight examinations before awarding them a certificate of education, the number of interview ratings made of the students did not correspond with the number of final examinations that the students had to sit at the college. The reasons for this could be that the colleges were confident that those students obtaining high ratings in the academic interviews would obtain high ratings in all of the theoretical areas of the colleges' courses, and that those obtaining high ratings in the practical physical education interview tests would obtain high ratings in the final examinations for all of the physical education practical activities. Others might suggest that a "halo effect" is often observed in the assessing of students; that is, those students who impress tutors in one situation tend to be rated highly in other situations.

The purposes of this part of the study were:

a) to discover whether physical education and academic students differed in respect to examination performances,

b) in view of the previous research emphasising the unreliability and invalidity of examinations, to raise the question of what actually is being tested by the various measures used in colleges' final assessments,

and c) to highlight other questions for future research rather than to attempt to provide answers.

Hypothesis 3 states that students obtaining a high rating in one subject in the college final examinations tend to obtain higher ratings in all subjects than students obtaining a low rating in that subject.

Table 15 shows the numbers of students achieving High (Grades A and B) and Low (Grades C, D and E) ratings in one subject who were rated High and Low in all other subjects when their grades were combined and averaged. The full details of the ratings of students appear in Appendix B.

TABLE 15.

Relationships among the ratings of students in various courses at ten colleges.

(a) Physical Education Students.

		EDUCATION		TEACHING		ENGLISH		SUBSIDIARY SUBJECT		MAIN SUBJECT	
		HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES
ALL OTHER COLLEGE EXAMS	HIGH SCORE	182	207	222	98	69	59	133	148	253	49
	LOW SCORE	91	683	196	647	16	100	88	473	289	572
	n	1163		1163		244		842		1163	

(b) Academic Students.

ALL OTHER COLLEGE EXAMS	HIGH SCORE	124	96	125	59	77	39	98	58	135	48
	LOW SCORE	63	271	92	278	38	115	55	205	81	290
	n	554		554		269		416		554	

(c) All Students.

ALL OTHER COLLEGE EXAMS	HIGH SCORE	306	303	347	157	146	98	231	206	388	97
	LOW SCORE	154	954	288	925	54	215	143	678	370	862
	n	1717		1717		513		1258		1717	

CONSISTENCY of a single result with the overall results.

(High/High) + (Low/Low), 388 + 862 = 1250

INCONSISTENCY and/or independence.

(High/Low) + (Low/High), 97 + 370 = 467

Statistical Treatment.

Table 16c indicates that there was a tendency for students who obtained high ratings in one subject to be rated high in the other subjects of their final examinations. However, differences were observed among the colleges under some subject headings and also when the ratings of physical education and academic students were compared.

The method chosen to ascertain the strength of the relationships between students' ratings in the various examinations was the product-moment correlation. Correlation Coefficients were calculated between students' achievements on five variables at six colleges - Education, Teaching, English, Subsidiary Subject and Main Subject. These coefficients were averaged using Fisher z transformations, and matrices of intercorrelations were produced (Table 16). The results are shown separately for physical education and academic students.

TABLE 16.

Relationships among the ratings of students during the final examinations at six colleges.

(a) Physical Education Students (n = 804).

EXAMINATIONS	Correlation Coefficients (Decimal points omitted). EDUCATION	TEACHING	ENGLISH	SUBSIDIARY SUBJECT	MAIN SUBJECT
EDUCATION					
TEACHING	26**				
ENGLISH	39**	21*			
SUBSIDIARY SUBJECT	35**	16	18*		
MAIN SUBJECT	33**	32**	12	23*	

(b) Academic Students (n = 554)

EDUCATION					
TEACHING	21*				
ENGLISH	36**	13			
SUBSIDIARY SUBJECT	20*	22*	31**		
MAIN SUBJECT	32**	29**	16	22*	

(c) All Students (n = 1358)

EDUCATION					
TEACHING	24**				
ENGLISH	38**	17*			
SUBSIDIARY SUBJECT	30**	18*	25**		
MAIN SUBJECT	33**	30**	13	23**	

* - significant at the 5% level.

** - significant at the 1% level.

Statistical Decision.

It was concluded that the evidence justified the acceptance of the hypothesis, for in the case of both physical education and academic students, those obtaining high grades in one subject in the college final examinations tended to obtain high grades in all subjects.

Discussion.

It will be seen in Table 16a that out of ten interrelationships between physical education students' scores in the colleges' final assessments only two were not significant. Students' teaching marks were not related to students' subsidiary subject marks, but this will not necessarily be regarded by some as surprising, for the teaching marks were awarded by physical education lecturers for students' performances in the teaching of physical education. In the case of the lack of a significant relationship between students' marks in the English course examinations and their performance in the overall physical education examinations, in view of the fact that the examinations included practical physical education skill tests and papers in anatomy and physiology, it could be said that the better scholar in English would not necessarily be expected to hold an advantage over the others.

Similarly in Table 16b there are only two out of ten interrelationships which are not significantly related. Academic students' marks in their English course were not related significantly to their grades either in teaching or in their main subject examinations. If it were shown to be a general feature of colleges of education that ability in English was regarded as of little importance to future teachers, then no doubt this would be regretted by many educationists. But present-day reports are numerous of teachers who are poor at spelling and who consider such ability

as unimportant, while at colleges and universities it has been claimed that many good students, especially in sciences, show poor aptitude in English. It could be therefore that in assessing students' main subject ability, college lecturers were specifically interested to discover whether or not students knew particular facts, and were not concerned with the manner in which students expressed themselves.

Other features of note in Table 16 include the nature of the relationship of students' ability in education and teaching. In the case of physical education students, there was a 1% level of significance relationship between students' education theory examination marks and their teaching of physical education marks, whereas there was only a 5% level of significance relationship between academic students' education marks and their academic subject teaching marks. Regret has been expressed about the low level of relationship between students' marks in education and teaching (Fontana. 1971). However, with the scores of physical education and academic students combined there was a 1% level relationship between the two ratings in the case of the students' records examined in this research.

Thus the pattern of both physical education and academic students' performances in final examinations in college appear to be that one group of students obtained high marks in all of the theoretical aspects of the courses, while those who achieved high grades in teaching ability were normally those who obtained high grades in their main subject examinations - the possibility in these cases of the existence of a "halo" effect cannot be ruled out, however. There remains the whole question of what actually is being tested in the final examinations, though the use of Factor Analysis may have shown up clusters of student abilities. But it does appear that some students are generally more successful throughout the colleges' finals, therefore it could be said that the colleges should be able to be more accurate in their selection than the findings related to Hypothesis 2 tended to show.

4.4 HYPOTHESIS 4.

Historically, physical education teachers have been regarded as more likely to be physically fit than intellectually bright (Musgrove and Taylor, 1969; Owen, 1970; Biglin, 1968), and this premise also has been applied to women physical educationists (Cannon, 1964). In recent years, however, bachelor degrees have been awarded to students who have completed successfully four-year courses of academic study at colleges of education in England and Wales, and physical education has been a subject accepted by most universities as worthy of inclusion as a main subject in these courses. Nevertheless, there lurks the suspicion that some colleges' 'academic' subject tutors might in their assessment of students be affected by the main subject course that the students are attending, and for instance rate physical education students lower than they would 'academic' students. At the same time, it could well be that the physical education tutors in the colleges of education tend to award higher grades to physical education students than might normally be expected if unbiased tutors were used in the grading. An additional fact that might be reflected in the pre-college entrance ratings of the students is that competition for physical education places in the colleges is greater than is the case for academic students, therefore the students admitted to physical education places might be expected to have higher pre-college entrance ratings than the academic students.

Hypothesis 4 states that physical education students as a group tend to obtain mean ratings and grades which are either markedly worse or markedly better than students of other subjects.

This hypothesis could be subdivided into three main assertions:

(a) that physical education students tend to be rated higher

than academic students in the pre-college entrance grades,

(b) that physical education students tend to be rated lower than academic students in the non-physical education aspects of the colleges' assessments,

and (c) that the teaching and main subject marks obtained by physical education students tend to be higher than the marks awarded to academic students in these two subjects.

Table 17 contains the means and standard deviations of the scores obtained by the students (the full details appear in Appendix B); Figures 1 and 2 illustrate the differences between the mean scores obtained by physical education and academic students in the various assessments, and Table 18 compares the percentages of physical education and academic students who obtained High (Grades A and B) and Low (Grades C, D and E) ratings in various assessments.

TABLE 17.

Means and standard deviations of the scores obtained by physical education and academic students in the different measures of their ability at five colleges.

(a)

	HEADMASTERS' ASSESSMENTS		G.C.E.'A'LEVEL ATTAINMENT		ACADEMIC INTERVIEWS		PERSONALITY INTERVIEWS		OVERALL	
	MEAN	s.d.	MEAN	s.d.	MEAN	s.d.	MEAN	s.d.	MEAN	s.d.
PE	4.01	0.63	3.03	0.95	3.32	0.59	3.58	0.61	3.48	0.70
AC	3.78	0.73	3.28	1.06	3.24	0.60	3.38	0.64	3.42	0.76

(b)

	EDUCATION		ENGLISH		SUBSIDIARY SUBJECT		OVERALL	
	MEAN	s.d.	MEAN	s.d.	MEAN	s.d.	MEAN	s.d.
PE	3.15	0.64	3.33	0.58	3.17	0.70	3.22	0.65
AC	3.17	0.65	3.46	0.64	3.30	0.77	3.31	0.69

(c)

	TEACHING		MAIN SUBJECT		OVERALL	
	MEAN	s.d.	MEAN	s.d.	MEAN	s.d.
PE	3.45	0.74	3.56	0.73	3.51	0.74
AC	3.36	0.74	3.25	0.85	3.30	0.79

(d)

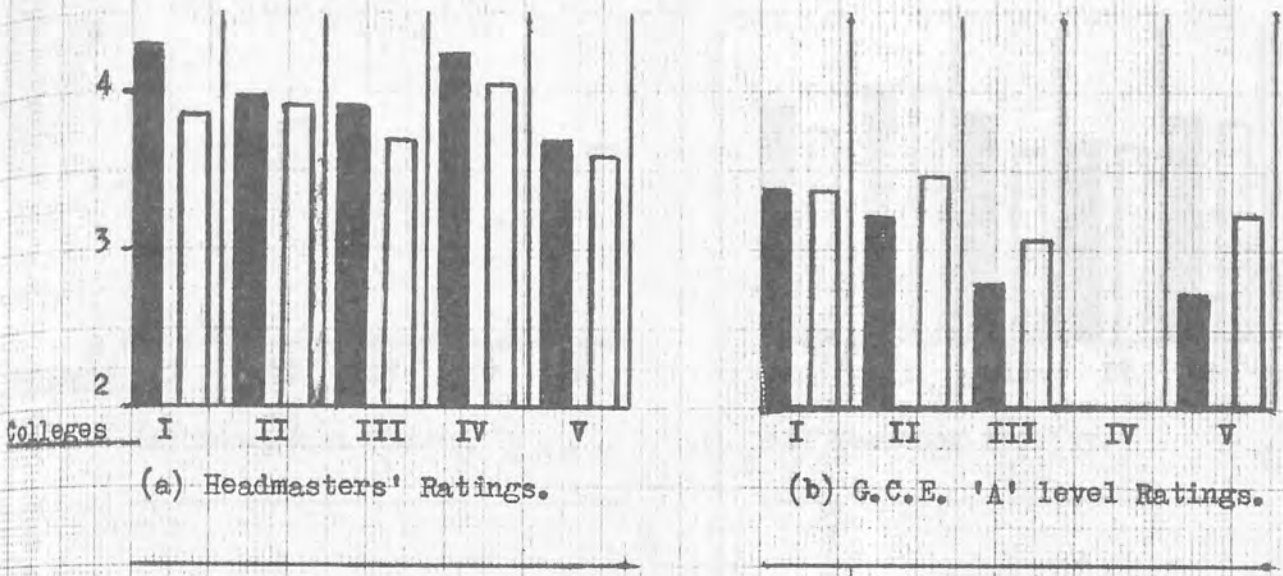
	ALL ASSESSMENTS	
	MEAN	s.d.
PE	3.40	0.70
AC	3.34	0.75

PE = Physical Education Students (n = 613).

AC = Academic Students (n = 554).

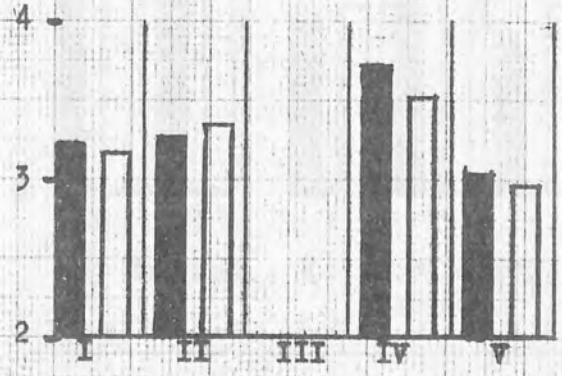
FIGURE 1.

Differences between the mean ratings obtained in pre-college entrance assessments by physical education and academic students at five colleges.

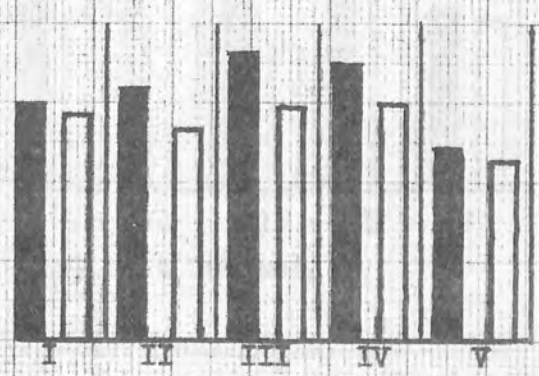


(a) Headmasters' Ratings.

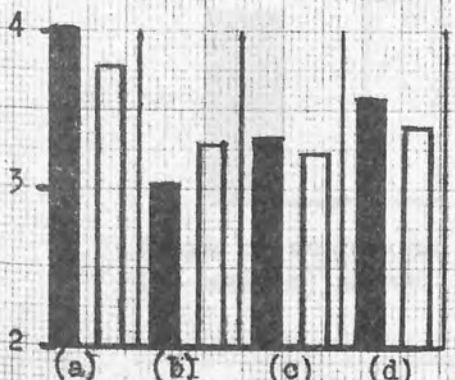
(b) G.C.E. 'A' level Ratings.



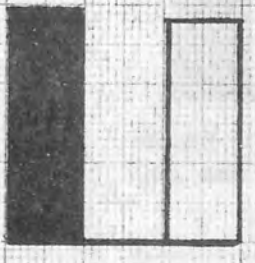
(c) Academic Interview.



(d) Personality Interview.



Means of scores above.

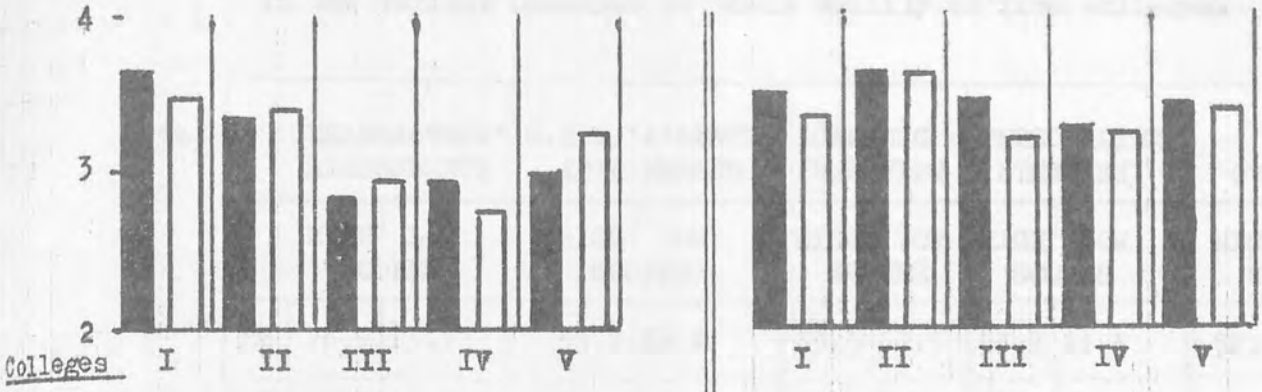


Overall difference between all mean scores.

KEY: { 5 - 'A' grade; 4 - 'B' grade; 3 - 'C' grade; 2 - 'D' grade; 1 - 'E' grade.

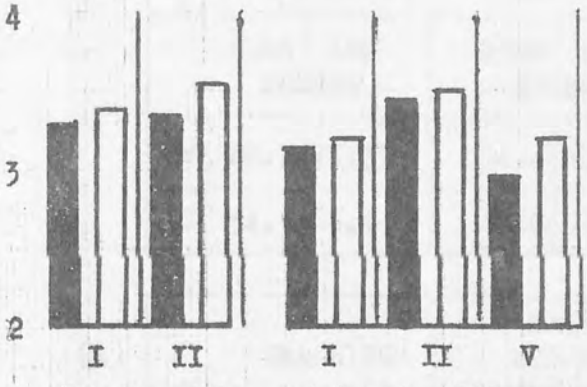
FIGURE 2.

Differences between the mean grades obtained in final examinations by physical education and academic students at five colleges.

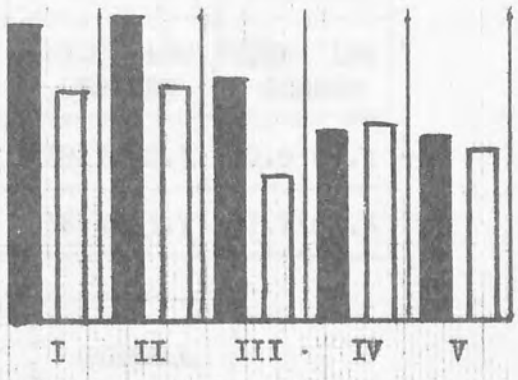


(a) Education Theory.

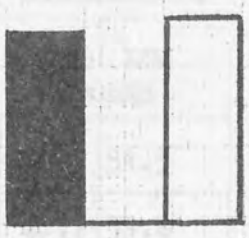
(d) Teaching Ability.



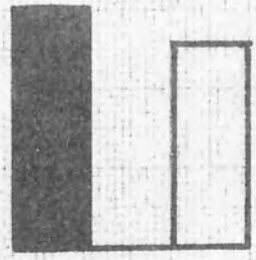
(b) English. (c) Subsidiary Subject.



(e) Main Subject.



Means of scores on (a), (b) and (c) above.



Means of scores on (d) and (e) above.

KEY: 5 - 'A' grade; 4 - 'B' grade; 3 - 'C' grade; 2 - 'D' grade; 1 - 'E' grade.

■ Physical Education Students. □ Academic Students.

TABLE 18.

Percentage numbers of students obtaining high and low ratings in the various measures of their ability at five colleges.

(a)

	HEADMASTERS' ASSESSMENTS		G.C.E. 'A' LEVEL ATTAINMENTS		ACADEMIC INTERVIEW		PERSONALITY INTERVIEW		OVERALL	
	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES
PE	76.9	23.1	35.2	64.8	39.5	60.5	58.7	41.3	52.6	47.4
AC	63.5	36.5	44.6	55.4	29.0	71.0	38.6	61.4	43.9	56.1

(b)

	EDUCATION		ENGLISH		SUBSIDIARY SUBJECT		OVERALL	
	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES
PE	28.7	71.3	34.4	65.6	29.7	70.3	30.9	69.1
AC	34.1	65.9	42.8	57.2	36.3	63.7	37.7	62.3

(c)

	TEACHING		MAIN SUBJECT		OVERALL	
	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES
PE	41.6	58.4	83.6	16.4	62.6	37.4
AC	39.4	60.6	38.4	61.6	38.9	61.1

(d)

	ALL ASSESSMENTS	
	HIGH SCORES	LOW SCORES
PE	48.7	51.3
AC	40.2	59.8

PE = Physical Education Students (n = 613).

AC = Academic Students (n = 554).

Statistical Treatment.

The criteria for awarding the various literal grades or percentage scores to students differed among the colleges. The t-test technique was therefore applied to the data from each college separately, so that any significant differences between the mean ratings of physical education and academic students could be observed. The full details of the data collected appears in Appendix B, and a summary of the results of the t-test is in Table 19.

TABLE 19.

Results of the t-test of the differences between mean scores of physical education and academic students in various assessments at five colleges of education.

MEASURES OF STUDENT ABILITY	COLLEGES				
	I	II	III	IV	V
	t values				
HEADMASTERS' ASSESSMENTS	8.95**	1.47	1.35	1.92	0.88
G.C.E. 'A' LEVEL ATTAINMENT	0.08	1.72	2.12*	n.d.a.	3.65**
ACADEMIC INTERVIEWS	0.78	0.59	n.d.a.	2.26*	1.02
PERSONALITY INTERVIEWS	1.13	2.84**	3.43**	2.87**	0.94
EDUCATION	1.98*	0.75	0.79	2.17*	3.02**
ENGLISH	1.21	2.30*	n.d.a.	n.d.a.	n.d.a.
SUBSIDIARY SUBJECT	0.76	0.64	n.d.a.	n.d.a.	2.45*
TEACHING	1.90*	0.21	2.28*	0.23	0.30
MAIN SUBJECT	4.67**	4.13**	5.30**	0.32	0.77

n.d.a. - no data available.
* - significant at the 5% level
** - significant at the 1% level

Statistical Decisions.

The results, taken into consideration with the percentage distribution of scores (Table 18) indicate:

(a) that the physical education students tended to obtain higher interview and headmasters' ratings than academic students, but the academic students tended to have the better G.C.E. 'A' level results;

(b) in the colleges' English and subsidiary subject final examinations, the academic students were rated higher than the physical education students, but in the other non-physical education aspect of the course, education theory, at two out of five colleges there were significant differences between the mean scores in favour of the physical education students;

(c) throughout the colleges, the overall tendency was for physical education lecturers to award more high grades (A and B) to their students for teaching ability and main subject performances than the academic tutors awarded to their academic students; in five out of ten cases the differences between the mean grades obtained by the two groups of students were statistically significant.

Discussion.

Generally, more physical education students at the five colleges tended to have obtained A and B grades in the headmasters' assessments than did the academic students. The opinion has been expressed that for "advanced main" courses, physical education departments in colleges

could be most selective for there were numerous candidates competing for each place available (Hargreaves, 1968), whereas the annual Department of Education and Science figures in "Statistics in Education" in recent years have tended to suggest that overall only about 2½% of the candidates are rejected by colleges of education and some academic subject departments have accepted students with the bare minimum in qualifications and recommendations. Thus it could be expected that those departments which could be more selective would confine their offers of interviews to students with high headmasters' ratings.

The G.C.E. 'A' level attainment of the physical education students at the five colleges was inferior to that of the academic students. Previous research at all of the ten "advanced main" physical education colleges shows that overall the physical education students' G.C.E. attainment was superior (Hargreaves, 1968). However, this simply emphasises that the colleges differ considerably in the nature of the students they accept.

Another pre-college entrance grade in which the physical education students tended to obtain higher ratings than academic students was in the personality interview assessment. These interviews were normally conducted at the colleges by the education departments' staffs whose task was mainly to forecast the students' teaching potential. The difference in ratings obtained by the two groups of students may be explained by the fact that the education staff viewed teaching potential in classroom and gymnasia situations as different, therefore using different criteria upon which to base their ratings, or it could be that the physical education students <u>were</u> more impressive at the interviews (the male physical education teacher has been described as a popular figure in schools, "a good man for the headmaster to play golf with but not the first choice with whom to discuss professional problems" - Scotland, 1964).

In the colleges' final examinations, in five out of five cases the academic students obtained higher ratings in English and subsidiary subject than the physical education students. The reasons for this feature may be numerous; the academic students may well have been superior in their ability in English and their subsidiary subject before they arrived at the colleges; the academic subject students could well have applied greater effort to these studies during their college careers; the physical education students could have been too preoccupied with spare-time practical physical education and games team practices to apply themselves in as arduous a fashion as the academic students to their non-physical education studies; the physical education students may have considered non-physical education studies as of relative unimportance to future physical education teachers, or it could be that academic subject tutors were more severe in their assessing of physical education students.

When assessed by colleges' physical education staff, physical education students appear to obtain significantly higher grades than academic students obtain for similar subjects, i.e. teaching ability and main subject. The apparent greater generosity of the physical education lecturers to their physical education students may have several explanations, however it is difficult to think of any valid ones for regular positive skewing of the distribution of the physical education students' ratings.

In summary, the evidence shows that academic tutors tend to be biased in their judgement of physical education students, and physical education tutors are biased in favour of physical education students, in particular:

a) tutors of 'academic subjects' give consistently lower ratings in the subsidiary subjects and English to physical education students than to academic students,

and b) physical education tutors consistently give higher ratings to students for main subject and teaching marks than academic

tutors give to their students in comparable non-physical education areas.

In conclusion, there must be emphasised the differences that were perceived not only between physical education and academic students' ratings, but also among the distribution of the ratings among the various colleges. The discussion of the features peculiar to each college is confined to Chapter Five.

4.5 HYPOTHESIS 5.

Researchers have found that compared with the mean scores of the general population on Cattell's 16 P.F. questionnaire, physical education students tend to score higher on factors A (Warmheartedness), E (Dominance), F (Surgency), Q2- (Group dependence) and Q3- (Undisciplined self-conflict), and also higher on second-order factors QI (Extraversion), QII- (Stability) and QIII (Toughmindedness) (c. Saville, 1972; Kane, 1968). Others have shown that men and women physical educationists have roughly similar personality profiles (Hendry, 1970; Jones, 1970). What has not been established is whether success in the examinations in the colleges' physical education courses is related to high or low scores in particular personality traits as measured by Cattell's 16 P.F. questionnaire. If this were shown to be so, then the factors that guaranteed success in physical education teaching could be compared with those which other researchers have shown to be related to success in academic studies and classroom teaching, and inferences could be drawn about any differences that might be found.

This hypothesis states that students who obtain high ratings in physical education examinations differ significantly in personality from those who obtain low ratings and specifically that high achieving students tend to be high on traits contributing to Extraversion, Stability, and Toughmindedness while low achievers tend to be high on traits related to Introversion, High Anxiety and Tendermindedness.

Firstly, the mean scores of the group of physical education students tested on each of the factors of the 16 P.F. test were calculated and are shown in Table 20, the results of a similar survey by Kane (1968) are also given for comparison. These results indicate that the present group only

TABLE 20.

Comparison between the Cattell 16 P.F. (Form A) scores of physical education students in two different colleges of education.

SCORES.				FACTORS.	BRITISH NORMS - NEAREST WHOLE NUMBER STENS.
KANE (1968) n = 75		WHITEHEAD. n = 94			GENERAL POPULATION MEANS.
MEAN	S.D.	MEAN	S.D.		3 4 5 6 7 8 9
10.95	3.47	10.68	2.63	A	
9.99	1.28	8.47	1.96	B	
16.78	3.63	15.22	4.28	C	
13.00	4.16	15.87	4.01	E	
16.86	4.59	17.78	4.42	F	
11.62	3.43	10. 89	3.99	G	
15.14	4.98	13.95	4.93	H	
9.49	2.79	10. 07	7.92	I	
9.12	2.98	10.16	3.42	L	
11.22	3.56	11.94	3.64	M	
9.69	2.81	9.12	2.56	N	
10.74	4.14	9.96	3.36	O	
9.70	2.51	9.72	2.55	Q1	
9.00	3.10	10.11	3.09	Q2	
11.26	3.16	9.36	3.49	Q3	
12.99	4.40	12.67	4.75	Q4	

differed significantly in respect of Factors B and E, suggesting that the present group was not in any way unusual. A further demonstration of the fact that the present group was representative of college students was made by computing the inter-factor correlations among scores made by this group, and the results indicated that the pattern of responses did not differ markedly from a study by Cattell and Eber (1970). This comparison and full details of the results of the personality testing of this present group appear in Appendix G.

Secondly, the students' achievements in the final examinations were obtained and were divided into High (Grades A and B) and Low (Grades C, D and E) scores. Their relationship with High (Sten score 5.5+) and Low (5.5-) scores on three of Cattell's 16 P.F. second-order factors are shown in Table 21.

TABLE 21.

Relationships between the scores achieved in colleges' examinations by physical education students and their scores on personality traits as measured by Cattell's 16 P.F. questionnaire.

(n = 94).

SECOND-ORDER PERSONALITY FACTORS.		COLLEGE FINAL EXAMINATIONS.									
		P.E. THEORY		P.E. DISSERTATION		P.E. PRACTICALS		OVERALL P.E. MARK		P.E. TEACHING MARK	
		HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES	HIGH SCORES	LOW SCORES
QI	HIGH SCORE	33	39	40	32	50	22	44	28	37	35
EXTRAVERSION	LOW SCORE	8	14	11	11	16	6	11	11	7	15
QII-	HIGH SCORE	27	12	25	24	33	16	33	16	22	27
STABILITY	LOW SCORE	23	32	17	28	31	14	27	18	19	26
QIII	HIGH SCORE	25	22	28	19	40	7	31	16	21	26
TOUGH-MINDEDNESS	LOW SCORE	14	33	24	23	28	19	24	23	28	19

The above summary of student measures serve as an approximate indication of the nature of the relationships existing between measures of students' personality and their college achievements, e.g.

a) The more the number of High/High + Low/Low cases, the more there is an indication of a significant positive relationship between personality measures and college examination results;

and b) the more the number of High/Low + Low/High cases, there is less likelihood of positive relationships.

However, for the purposes of accurate interpretation, the primary data was subjected to a more appropriate statistical technique.

Statistical Treatment.

The subjects' raw scores obtained in the personality testing were calculated for each of sixteen factors, which were assigned alphabetical letters and descriptions of the personality traits associated with that factor. The raw scores were converted to sten scores using the established British norms, and second-order factor scores on Extraversion, Stability and Toughmindedness were also calculated using the formulae devised by Cattell (1964).

Correlation coefficients were calculated as a measure of the relationship existing between scores on each of the second-order factors and on each of the ratings of students in the college examinations. The results are set out in Table 22.

TABLE 22.

Relationships between physical education students' examination marks and their scores on three second-order personality factors. (n = 94).

	Correlation coefficients. (Decimal points omitted).					
SECOND ORDER PERSONALITY FACTORS	COLLEGE EXAMINATION MARKS					FISHER z TRANSFMTNS OF ALL P.E. RATINGS.
	P.E. THEORY	P.E. DISSERTATION	P.E. PRACTICALS	OVERALL P.E.MARK	P.E. TEACHING	
EXTRAVERSION	31**	19	20*	27**	21*	24*
STABILITY	34**	20*	03	14	08	16
TOUGHMINDED-NESS	23*	05	13	08	-01	10

* - significant at the 5% level.

** - significant at the 1% level.

Statistical Decision.

It was concluded from this evidence that students' high performances in physical education examinations were significantly related to high scores on personality traits related to Extraversion, but that high scores on personality traits related to Stability and Toughmindedness were not significantly related to high scores throughout all physical education examinations.

Discussion.

Success in the different sub-divisions of the physical education students' examinations appears to be related to differing measures of Extraversion, Stability and Toughmindedness, though generally the relationships were positive. This not only supports previous research evidence that physical education students differ in various ways from students of other subjects, but it also emphasises that whereas students' academic success generally is related to Introversion and Tendermindedness (Butcher and Rudd, 1972), physical education students' examination success tends to be dependent upon entirely opposite personality qualities.

Interpretation of such scores as the physical educationists' on Extraversion, Stability and Toughmindedness include:

> "should not be considered..favourable as a general predictor, e.g., of scholastic achievement,"
> "can mean lack of motivation for difficult tasks,"
> "likely to involve rapid action with insufficient consideration and thought,"
>
> (I.P.A.T., 1972, pages 26 - 28).

If these descriptions of physical education students at College I also apply to physical educationists generally, the implications should be considered most carefully. For in changing times, the assertive, rapid-action physical educationist is not the precision worker who is likely to contemplate the point of view of others who may be in disagreement with him, even though those with the opposite view be the more intelligent. In positions of leadership in physical education, he may well be a useful man in interpersonal contacts, but whether he would be leading the profession with a philosophy based on sound educational principles must remain in doubt. It has been suggested that a college of education selects students it can train (Halliwell, 1966), it may well be that physical education lecturers in colleges select students they can train, and unwittingly ensure a perpetuation of a system that may have been relevant in the past when they were students, but which is most inappropriate at present times in the light of present-day knowledge, present-day facilities, present-day needs and with even further developments in the future in mind.

If physical educationists would be content to work in situations in schools, colleges, or communities as experts in sports techniques and inspirers to greater effort in sporting situations, then it may well be that the tough, socially-outgoing, satisfied individual is the type who would be content simply to acquire the necessary information relating to skill-teaching and impart it in a friendly manner to those in his charge. But in such circumstances "physical education" would be a misnomer, for "education" implies more than physical training ("education - give intellectual and moral training", O.E.D.), and those employed solely in training the physical aspects would be no more than recreation supervisors, the training, salary and status of whom would not warrant their being equated with graduates in the teaching profession.

Therefore it is suggested that physical education lecturers should

reconsider the purpose and nature of their colleges courses and decide whether their present methods of selection and assessment place at a disadvantage particular students.. For it may be that introverted, tenderminded physical education tteachers would be more able to understand sympathetically the needs and intterests of schoolchildren than those who are presently selected for the colleges courses.

4.6 HYPOTHESIS 6.

One of the main purposes of examining colleges of education selection procedures is in estimating their value as predictors of students' success in the colleges' courses. But this process in itself would be incomplete if no follow-up study were to be carried out to discover to what extent success in the various college examinations ensured further success to the students in their post-college careers. Such follow-up studies have been carried out on the relationship between students' college or university success and their future careers but have usually been related to students of a number of different disciplines (Tudhope, 1942; Start, 1966; Nisbet, 1954). This present study attempted to combine the two processes of examining the accuracy of selection procedures as predictors of college examination success, and also attempted to determine whether physical education students at one college derived any enhancement in career prospects by obtaining higher grades in their final examinations.

The hypothesis states that students who obtained high ratings in college physical education examinations tend to be more successful in future careers than students who obtained low ratings.

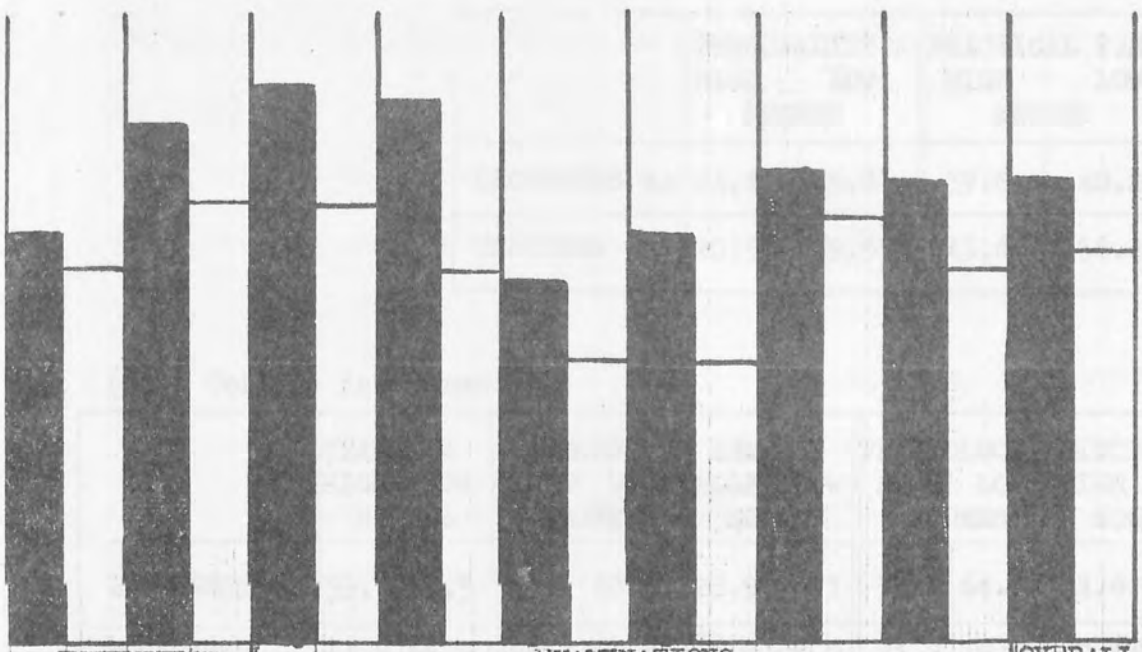
Data were collected in respect of a 25% random sample of those students who left College I between 1953 and 1962. The object was to ascertain the present educational appointment of these former students. A comparison would then have been made of the college achievements of the different groups, i.e. lecturers, inspectors, headmasters, teachers, etc. Numbers of returns overall were high, but within the sub-groups the numbers in some cases were low. Attempting to classify former students into categories of "success" proved difficult (e.g. is a teacher on a high teaching salary grade in a northern industrial city more "successful" than

a teacher who is on a slightly lower salary grade but who prefers to remain near a south-western coastal town? Additionally, should one take into account part-time income such as evening institute payments, or even income not related to education?) Consequently no "success" criteria were established, but the teachers were divided initially into those who had moved into what are regarded as promotion posts (lecturing and inspectors' roles), and those who had remained in schools (head-masters excluded) whether by choice or otherwise.

Figure 3 sets out the results of this part of the investigation, and Table 23 indicates the High (Grades A and B) and Low (Grades C, D and E) achievements of the two groups of students during their college careers.

FIGURE 3.

Differences between the grades awarded to lecturers, inspectors and teachers during their careers at College I.



INTERVIEWS				EXAMINATIONS												OVERALL		
Person'y		Pract.		Teaching		Method		Anatomy		Physiol		Princip		Prac PE.		Final MARK.		
3.3	3.19	3.64	3.4	3.77	3.38	3.7	3.18	3.14	2.89	3.26	2.90	3.5	3.35	3.47	3.18	3.48	3.24	MEANS
0.45	0.43	0.51	0.57	0.71	0.56	0.64	0.66	0.76	0.68	0.71	0.79	0.64	0.70	0.70	0.86	0.51	0.43	S.Dev.
L	T	L	T	L	T	L	T	L	T	L	T	L	T	L	T	L	T	

L - Lecturers and Inspectors (n = 62). - ■

T - Teachers (n = 78). - □

5 - 'A' grade; 4 - 'B' grade; 3 - 'C' grade; 2 - 'D' grade; 1 - 'E' grade.

TABLE 23.

Distribution of the ratings of lecturers/inspectors and teachers during their careers at College I.

(Figures represent percentages).

(a) Interview ratings.

	PERSONALITY HIGH SCORES	PERSONALITY LOW SCORES	PRACTICAL P.E. HIGH SCORES	PRACTICAL P.E. LOW SCORES
LECTURERS &c	24.2	75.8	59.8	40.2
TEACHERS	20.5	79.5	43.6	56.4

(b) College Assessments.

	TEACHING HIGH	TEACHING LOW	METHOD HIGH	METHOD LOW	ANATOMY HIGH	ANATOMY LOW	PHYSIOLOGY HIGH	PHYSIOLOGY LOW	PRINCIPLES HIGH	PRINCIPLES LOW	PRACTICAL HIGH	PRACTICAL LOW
	SCORES		SCORES		SCORES		SCORES		SCORES		SCORES	
LECTURERS &c	59.7	40.3	59.7	40.3	25.9	74.1	35.4	64.6	51.6	48.4	48.4	51.6
TEACHERS	34.8	65.2	28.3	71.7	12.8	87.2	21.8	78.2	30.8	69.2	32.0	68.0

(c) Overall Ratings.

	HIGH SCORES	LOW SCORES
LECTURERS &c	45.6	54.4
TEACHERS	28.1	71.9

Statistical Techniques.

To detect any difference in the college achievements of the groups, it was planned to use the t-test technique even though some measures of the students' abilities were available only in the form of literal grades, for researchers have been reassured of the validity of using the t-test technique in the circumstances of this present type of research:

> "(the technique) may be applied to qualitative ratings on a continuum which may be assigned numerical values, e.g. excellent - 3, good - 2, fair - 1, poor - 0".
>
> (Wert, 1954, page 179).

and

> "It is becoming more apparent that the technique is sufficiently satisfactory even where there is considerable departure from the strict fulfillment of the assumptions. The necessity for the homogeneity of variance is not as serious a consideration as it was formerly thought to be".
>
> (Wert, 1954, page 184).

Despite these reassurances, a test for homogeneity of variance was carried out and satisfied the author that the further calculations could be made of means, standard deviations and t values (Appendix H). The hypothesis that there is no difference between the mean assessments for teachers and lecturers was tested by means of the t-test technique, and a summary of the results appears in Table 24 (the full details of the calculations are to be found in Appendix H).

TABLE 24.

Difference perceived by means of the t-test between the college assessments of lecturers and inspectors as one group (n = 62) and schoolteachers as a second group (n = 78).

Assessments significantly different at the 1% level (t value in brackets).	Assessments significantly different at the 5% level (t value in brackets).	Assessments NOT significantly different (t value in brackets).
"Method" Examination (4.64)	Practical Interview (2.65)	Personality Interview (1.48)
Teaching Marks (3.54)	Practical P.E. Examination (2.21)	"Principles of P.E. Examination (1.33)
Overall P.E. Marks (3.00)		
Physiology Examination (2.84)	Anatomy Examination (2.03)	

Statistical Decisions.

It is to be concluded on this evidence provided by a single college that those students who obtained higher college ratings for method, teaching, physiology, anatomy, practical physical education, practical interview and overall physical education mark were likely to make the kind of career progress indicated by promotion to lectureships or posts as local authority inspectors of physical education, whereas those students obtaining low college ratings in those subjects were more likely to still be schoolteaching ten to twenty years after leaving college.

High ratings at personality interview and in the college final examination for "principles of physical education" were not indicators of the future career choice of the students.

Discussion.

The lecturers and inspectors obtained higher overall physical education examination results than the schoolteachers, the difference being significant at the 1% level. In fact, significant differences existed between the ratings of the two groups at interview and the college staff would be aware of the 'good' and 'poor' candidates. If the students themselves were aware of their interview ratings, then it could be said that a self-fulfilling prophecy may have applied, i.e. if a student is awarded an 'A' grade, he is likely:

i) to think of himself as an 'A' grade individual,

and ii) to be trated as an 'A' grade individual.

Thus the final examination marks may not entirely have been a reflection of students' abilities at the end of their course.

The college normally supported more strongly those students who obtained the higher overall marks in the applications for first teaching posts, thus it could be conjectured that during the 1950's, these higher graded students obtained the better equipped, higher status schools by virtue of their final college marks. Therefore in the promotion race, it may well be that these higher graded students already had an advantage over the other students whose lower college final examinations mark resulted in their going to schools at which the opportunities were not as favourable. But if it could be shown that the overall physical education marks, or the parts that contributed to this overall mark were not valid or not appropriate measures of ability in lecturing or inspectors' posts, then it could be said that those obtaining high grades in the college's examinations gained an unfair advantage over the other students in relation to promotion prospects.

4.7 HYPOTHESIS 7.

Students applying for admission to colleges of education courses are required to nominate a number of colleges which they would like to attend, in order of preference. Should a student be invited for interview at his first choice college but fail to obtain a place, then his application forms are passed on to his second-choice college at which a decision is made whether or not the student's qualifications warrant his being invited for interview with the second college's staff representatives. However, three main factors may have adverse effects upon the chances of students' being accepted at colleges other than their first choice. First, by the time a student's forms have reached his second-choice college, most of the vacancies at that college may have been filled by first-choice applicants. Secondly, some colleges or departments within colleges (for various reasons) will only accept first-choice candidates (even though second or third-choice candidates may be better qualified than the first-choice applicants). Thirdly, should the first interviewers use similar (though not necessarily valid) criteria in the selection of candidates, then at subsequent interviews students rejected by their first-choice colleges should have very little chance of being offered a college of education place.

No record could be found of any research findings that gave details of the eventual careers of physical education students rejected by colleges of education. Therefore this study attempted to obtain such information and also attempted to compare the fate of rejected physical education candidates with the employment or further study entered by rejected academic subject candidates.

This hypothesis states that applicants attending interviews for places on college of education courses who receive unacceptably low ratings are unlikely to complete similar courses successfully at other colleges of education or institutions of higher education.

The data collected to test this hypothesis appear in full in Appendix I. Table 25 provides a brief summary of the data collected.

TABLE 25.

Details of the candidates rejected by College I over a period of three years.

(a) Physical Education Candidates (n = 95)

Types of school attended.	Main subject interest.	G.C.E. attainment (mean no. of passes) Before Interview		After Interview		Careers after College I rejection.		
		'A'	'O'	'A'	'O'	Degree or degree-equiv courses.	Teacher-training	Professions or trades
Comp. 11 Gmr. 58 Publ. 2 S.Mod. 18 Tech. 6	Phys. Ed.	0	6	2	7	19	60	16

(b) Academic Subject Candidates (n = 84).

Comp. 14 Gmr. 49 Publ. 1 S.Mod. 14 Tech. 6	Art 8 Biol. 10 Chem. 8 Engl. 10 Fren. 4 Geog. 15 H/cf. 8 Hist. 7 Math. 5 Mus. 1 Phys. 4 R.K. 3 Rur.S. 1	0	6	2	7	28	39	17

Statistical Technique.

A questionnaire (Appendix C) was sent to all physical education and academic subject candidates rejected by College I after interviews in 1965, 1966 and 1967. Unfortunately, a large number failed to complete all the sections of the questionnaire in a sufficiently detailed fashion.

Therefore it was not possible to grade their achievements since their ill-fated interviews. However, a sufficiently large percentage returned the questionnaires (56.2%), so the results are reported in the next chapter by classifying the candidates into different broad achievement groups, and simple percentage scores and means are used to highlight differences between the groups and relative overall success or failure of these candidates in their alternative careers. The full details of the rejected students' eventual careers appear in Appendix I, and are summarized in Table 26.

TABLE 26.

Details of alternative courses/occupations entered by candidates rejected by College I over a period of three years.

	Physical Education Candidates (n = 95)	Academic Subject Candidates (n = 84)	All Candidates (n = 179)
Completed successfully degree or degree-equivalent courses.	20%	32.5%	26.3%
Completed successfully teacher-training courses.	63.2%	47.0%	55.1%
Entered professions or trades unrelated to Education.	16.8%	20.5%	18.6%

Statistical Decision.

From the evidence available, it was concluded that students who were not offered places after interview at College I were likely to complete successfully degree or teacher-training courses at other colleges or institutions of higher education.

Discussion.

It is difficult to compare the attainments of students accepted by the college with those rejected, but it is clear that less than one-fifth of all students rejected at College I did not obtain a degree or teaching certificate from universities, polytechnics, or other colleges of education. Those candidates rejected by College I who did not manage to complete higher education courses elsewhere were distinguishable from the others in that their G.C.E. 'A' level attainment was weaker, but this was something which could have been observed when the application forms were being perused before the candidates were invited to attend an interview. Yet, on arriving for interview at College I, the interview ratings of the eventual tradesmen were no lower than those candidates who eventually went to universities or other colleges!

The results of this investigation would not allay the suspicions of those who in the past have not placed great faith in colleges' selection procedures. Perhaps physical education lecturers will take solace in the fact that the criticisms that may be made of the inaccurate selection procedures is directed not only at the physical educationists, but also at the academic subject tutors and education staffs in colleges. However, this would not console those students who had been rejected by the colleges. What would appear to be necessary is a reconsideration of the selection procedures for both physical education and academic students at College I, for it would appear that candidates may have been rejected on unsound criteria and this implies that the procedures therefore preclude the admission to College I of some students more able than those whom the college presently admit.

4.8 SUMMARY.

On the foregoing evidence, it appears that headmasters did not base their assessment of teaching potential exclusively on students' G.C.E. 'A' level attainment. It further appears to be the case that the predictive value of college interviewers' selection ratings was no better than random selection, for the students who obtained high ratings at interview were not those who obtained high examination results, and the candidates rejected after college interviews tended to obtain degrees or teacher-training qualifications at other institutions of higher education.

In the colleges' examinations, physical education students tended to obtain higher ratings than academic students for teaching ability and in the main subject courses, but lower ratings in English and subsidiary subject. Studying the personality of the students, the physical education students who were successful in the college examinations were highly extraverted, and more likely to obtain high scores than low scores on personality factors measuring Stability and Tough-mindedness.

Finally, in the investigation confined to one college, those former students who obtained high ratings in the final examinations tended to be in lecturing and inspectors' posts ten to twenty years after leaving college, whereas those students who obtained low final examination ratings tended to still be in schoolteaching.

As many differences were observed among the various colleges in their methods of selecting and assessing students, the next chapter contains discussion of the unique features of the colleges which differed from the general pattern.

CHAPTER FIVE.

INTERPRETATION OF RESULTS.

"Life is the art of drawing
sufficient conclusions from
insufficient premises".

SAMUEL BUTLER, Note-Books, Life, 9.

5. INTERPRETATION OF RESULTS.

The main results in Chapter Four indicated that:

(a) qualities other than students' academic ability were taken into account by headmasters and college lecturers when they were estimating students' teaching potential;

(b) the predictive value of the colleges' selection procedures was very low;

(c) students who attained good performances in one college examination tended to achieve good grades in other college examinations;

(d) physical education students tended to obtain higher ratings than academic students in teaching ability and main subject examinations, while academic students tended to obtain higher ratings in English and subsidiary subject examinations;

(e) the more successful physical education students in college examinations tended to be highly extraverted and more likely to obtain high scores than low scores on personality factors measuring Stability and Toughmindedness;

(f) physical education students obtaining high scores in their college examinations were more likely to become lecturers and inspectors than those who obtained low scores,

and (g) physical education and academic subject candidates who were rejected after college interview tended to obtain degrees or teacher-training qualifications at other institutions of higher education.

However, the interpretation of these results must proceed with some caution for a number of reasons:

First, firm conclusions could not be drawn about Colleges VII, VIII, IX and X because the records of students attainment at these colleges were not sufficiently detailed for the most accurate of statistical interpretations to be carried out.

Secondly, differences were observed in the selection procedures and methods of assessment among the colleges that indicated a need for a separate study of each college to ascertain how they differed from the general pattern.

Thirdly, the pattern implied by the results was not always operative for both the physical education and academic student groups even within the same college.

Therefore, in this chapter, the results are interpreted to demonstrate the ways in which individual colleges deviate from the overall results, the ways in which the individual colleges differ from one another, and the particularity of the results for physical education and academic students.

5.1 COLLEGE I.

A more comprehensive study was made of the students at College I than any of the other colleges because the students and their records were more readily available for examination. Therefore what may appear to be a disproportionate amount of attention to this college is given because it may well be that many of the comments could apply to the other colleges too, thus a repetition many times of the same assertions is avoided.

PHYSICAL EDUCATION STUDENTS.

Selection.

Reference to Table 27 will show that for the physical education students at College I, the results relating to selection procedures were similar to the pattern of the general results, that is there were significant relationships among the students' scores on the pre-college entrance grades. It might be suggested that this indicates a multiplication of effort and that the selection procedures could therefore have been based on only one or two of these student measures.

However, the staff at College I would no doubt argue that the five pre-college entrance grades were measuring different attributes and were therefore all necessary predictors. They would point for instance to the fact that the students' practical interview scores were not significantly related to the other grades and in fact were negatively related to students' G.C.E. 'A' level attainment and students' scores at academic interview.

Nevertheless, an examination of the relationships between students' scores on the pre-college entrance grades and their scores in the college final examinations shows that out of forty comparisons, there were only nine significant correlations (that is, accurate predictions by the pre-college entrance grades of students' scores in the college examinations), whereas thirty-one of the relationships were either negative or not significant.

TABLE 27

Relationships, indicated by coefficients of correlation, among the various measures of physical education students' abilities at College I. (n = 138).

VARIABLE No. AND NAME.	CORRELATIONS. 1	2	3	4	5	6	7	8	9	10	11	12	13
1. HEADMA.													
2. GCALEV.	* 19												
3. INACAD.	** 33	** 58											
4. INPERS.	** 23	* 20	* 19										
5. INPRAC.	05	-07	-16	08									
6. EDUCMK.	10	** 34	* 18	10	-04								
7. TCHGMK.	-06	04	-06	02	* 17	** 28							
8. ENGMAK.	-03	** 22	16	16	-11	** 33	11						
9. SUBSID.	-00	** 25	* 20	03	-10	** 23	16	02					
10. MAINMK.	-01	-13	-16	-06	04	-16	-01	-16	-03				
11. PETHEO.	08	** 25	* 18	02	-09	** 43	** 22	09	* 19	-04			
12. PEDISS.	-03	** 22	12	05	-01	* 17	11	** 22	-02	-09	** 26		
13. PEPRAC.	-14	-06	-09	-11	04	-10	-07	* -19	-06	** 58	-00	-04	

* - significant at the 5% level.
** - significant at the 1% level.

Decimal points have been omitted.

Therefore the pre-college entrance grades overall tended to be of no greater accuracy than random selection. Furthermore, the physical education special interview feature, i.e. the students' practical interview scores, only correlated significantly with the students' teaching of physical education mark, and as the students' teaching ability was also assessed by physical education lecturers, this could not be regarded as entirely unexpected.

Most of the other relationships between students' practical interview scores and students' final examination attainment were negative, and though not significant, this suggests that the good practical physical education performer tended to be the one who was likely to obtain the low ratings in the academic aspects of the college examinations.

A further emphasis of the extent of the inaccuracy of the pre-college entrance grades as predictors of students' attainment is to be found by studying Appendix F (1), where there are the regression equations and standard error of the estimate of the various correlation coefficients. Additionally, the further step was taken of computing multiple correlation coefficients from the data (Appendix F 3) to ascertain whether combinations of predictors were more accurate than the single ones. College I was not unique in respect to the inaccuracy of its predictions, for throughout the colleges, no greater accuracy was perceived in calculating the Multiple R compared with the simple r.

It would appear therefore, that at College I the most successful predictor of physical education students' college success was the G.C.E. 'A' level attainment, with five 1% level significant correlations out of a possible eight. This suggests that the college interviews were not only superfluous, but tended also to be misleading indicators of student abilities.

Rejected Students.

A further test of the accuracy of the selection procedures at College I was possible by ascertaining the eventual educational and career progress of

95 physical education candidates who were interviewed by the College I staff but who were rejected for various reasons as being unsuitable. Though not offered a place at College I, 83% of these candidates in fact completed successfully higher education courses at other institutions, and some of them achieved particular success (Appendix I(A) contains full details of these candidates' qualifications, interview results and later careers).

Of the four who went to universities, it must be assumed that candidate P.E. 1 was rejected by the college on the evidence of his practical physical education ability (he obtained a D grade) and the fact that at personality interview he was "not a very lively person". This young man, and [redacted] the other three eventual university graduates, opted for an academic subject career after being rejected for the physical education profession, and it may well be that they would not have become good teachers of physical education, however the reverse may well also have been true. The academic ability assessments of candidates P.E. 2 and P.E. 4 seem not only to have been inaccurate predictors of their eventual success, but also were unrelated to their past success, for though at the time of the interview he possessed two more G.C.E. 'A' level passes than P.E. 1, P.E. 3 was graded lower by the college's interviewers!

Five other rejected physical education candidates decided to look for careers other than in physical education and were accepted for degree (or "degree-equivalent") courses at polytechnics. Their G.C.E. 'A' level attainment overall was as good as most of those students who were accepted by the college (Appendix B I), but their grades for the practical interview tests were generally lower. This seemed to apply in the case of most of the other rejected candidates. It is difficult to avoid the conclusion that practical physical education ability was one of the main criteria upon which the college based its selection.

Ten students rejected by College I were accepted at other colleges of education and were successful in both the certificate of education and the B.Ed.

degree courses. The actual reasons for their rejection were not obvious, though the D grade of P.E. 12 for academic ability and the interview comment suggest that there was concern about his ability to cope with academic work, a judgment that proved inaccurate. Overall, these students achieved as many G.C.E. 'A' level examination passes as those who entered the college, but generally their practical interview test scores were low. However, they were not lost to teaching, for other colleges accepted them and they completed their teacher-training and bachelor degree courses successfully.

A further fifty rejected candidates qualified for the teaching profession at other colleges, at least six of them distinguishing themselves by obtaining high grades in their colleges' final examinations. Twenty of these had obtained two or three G.C.E. 'A' level examination passes, yet only one of them was graded B at interview for academic ability, two were graded B-, the remainder obtaining C grades, with one secondary-modern schoolboy being graded D. The practical physical education ability of these twenty was lower than those normally accepted at the college, this also applied to all except six of the total number of students who eventually became teachers. The six high scoring practical test candidates who were rejected by College I presumably failed to gain a place because they achieved low grades at either personality or academic interviews. The comments noted about the students neither explained adequately the students' non-acceptance (for many of them were complimentary) nor did the comments throw light on any of the criteria used. The interview comments included references to speech disorders, poor eyesight, obesity and in the case of P.E. 30 the fact that he was "inappropriately dressed". That such factors as the last two might not be looked upon favourably in the college could have been anticipated perhaps at school and the candidates could have been forewarned. This poses the problem of preparation for interview, for students from some schools are left to their own devices, whereas others arrive at colleges well rehearsed for both the practical and oral interviews. Therefore students' success at interviews may

also be related to the interview preparation they receive at their schools.

All except one of the nine students who did not go into colleges of education obtained two or three G.C.E. 'A' level passes, though their academic interview grades were not all high. In fact, P.E. 81 obtained B grades for academic ability and personality as well as favourable interview comments, his practical test grade of D may be the clue to his rejection by the college; he decided to pursue an alternative career. An interesting feature is that none of the rejected candidates were graded E on the five-point scale in any of the assessments, and if the rejected candidates' ratings were compared with the "average", only one rejected physical education candidate would have been below average, that is a D grade overall. Again it is conjectural whether or not an overall impression is what decides the acceptance of a candidate, and if so, candidates such as P.E. 84 could well have been advised by their schools of the value of particular behaviour during interviews, for the interviewing lecturers felt that it was significant to note that he "did not look us straight in the eye".

Seven applicants who were rejected went into occupations wherein further examinations were not a feature essential to their career advancement. Again only one of these candidates' "average" would have been a D grade overall, the remainder of them obtained mainly C grades. Significantly their G.C.E. 'A' level success was only just adequate for admission to any college of education, but six of the seven were allocated C grades for their academic ability, grades which do not seem to be related either to their pre-interview or post-interview G.C.E. attainment.

The purpose of selection procedures is to accept those candidates who are most likely to do well on the course offered and to reject those who are unlikely to succeed. There is an implied claim to predict the eventual achievement of those who are accepted. It has been shown that the achievement of a high percentage of rejected applicants is in fact above average. It has been further shown that the predictions of eventual success on the course implicit

in the selection procedures are scarcely above a chance level of success. These two lines of evidence are sufficient to call in question the usefulness of the costly, time-consuming selection procedures employed by College I and perhaps other colleges.

The College Examinations.

Referring to the examination performances of those physical education students admitted to College I (Table 27), it will be observed that the results followed the general pattern at all colleges in that students who obtained a high mark in one college examination was likely to obtain high marks in all of the examinations. Specifically at College I, those students who obtained high marks in Education tended to obtain high marks in other theoretical aspects of the course, viz. English, subsidiary subject and physical education theory. But, there were negative relationships between students' overall physical education marks and all of their other college marks excepting practical physical education ability (in this case there being a 1% level significant positive correlation). Thus a problem is highlighted for the physical education staff at College I, because it would appear that the students whom they selected for their courses and who obtained high marks in the physical education examinations were those who obtained low marks in the academic areas of the course. This suggests a dichotomy between intellectual ability and ability in physical education - a belief often held by academics but challenged by physical educationists. Furthermore, there would be far more serious implications for the profession if it could be shown that these college examination results advantageously affected the future career prospects of those who obtained the high marks.

Follow-Up.

In fact, an examination of the careers entered by former College I students (Appendix H) tended to suggest that students who obtained high

college examination results were more likely to be in lecturing or inspectors' posts ten to twenty years after leaving the college than were those who obtained low college examination marks. What is more, an examination of the grades they obtained as early as their interview stage showed that although no significant differences were to be observed between the future lecturers and inspectors as one group and the future schoolteachers as another group on personality interview scores, significant differences were to be observed between the two groups' scores on the practical interview tests. Thus the importance of the practical element in physical education courses would appear to have been prominent before the students entered college.

Once at the college, the future lecturers and inspectors were also awarded the significantly higher marks for the teaching of physical education, and significant differences between the examination performances of the two groups were found in the "method" (how to teach) examinations, but not in the "principles of physical education" examinations. That is, superior ability and knowledge of how to organise lessons were to be found in the lecturers and organisers when compared with the school-teachers, but no significant differences existed between the two groups in respect to their ability to answer questions on the aims and objectives or purposes of the subject, perhaps thus confirming that physical education courses are more of a training in the teaching of physical skills than they are biased towards intellectual study.

Significant differences existed in the performances of the two groups of students in both anatomy and physiology examinations. The purpose of the anatomy and physiology courses in colleges of education has been queried by many and in particular in relation to their value to students on leaving the college. The suggestion has been made that they have been included to lend "academic respectability" to the courses, though not necessarily relevant (Whitehead, 1965 & 1969; Joyce, 1967). However, one value would appear to be to those who performed well in the two examinations, for the two papers

constituted a sizeable proportion of the final overall physical education marks, upon which the college based its recommendations to the schools at which the students had applied for teaching posts.

Another examination result which was part of the overall physical education mark was the practical physical education ability assessment. The future lecturers and inspectors were superior to the future school-teachers in practical ability grades, the difference being significant at the 1% level. Again the purpose of the practical ability assessments was not clear, but they appear to have been one of the pre-requisites of promotion even though the opportunity, the inclination and ageing generally soon seem to prevent physical educationists from being physically active once they leave college.

These findings tend to suggest that good practical physical education performers have possibly had an advantage over the better intellectually-endowed physical education students in the past, that is a suggestion of a "halo effect" in physical education lecturers' assessment of students. Past researchers have shown that the very good practical physical education performers, games players, international athletes and the like normally have personality traits which include high scores on Extraversion and Toughmindedness (Kane, 1968). But these personality factors are not normally associated with "good" teaching (Entwistle, 1971). Therefore, if it could be shown that the good practical physical education performers who obtained the high grades at College I were also extraverted and toughminded, then there would be even a further reason for the physical education staff to reconsider their selection procedures and their methods of assessment.

Students' Personality.

The measurement of physical education students' personality at College I produced a number of interesting results when they were related to the various assessments made of the students at the college. Overall, the more successful

physical education candidates at interview tended to be the more intelligent candidates who were serious by nature and sensitive - an entirely different personality from that generally described as typical of physical educationists!.

Yet, on arriving at the college, different types of students succeeded in different aspects of the college course. Students obtaining high scores on Factor B (Intelligence) were likely to obtain high scores at interview and in the physical education examinations, but were unlikely to obtain high grades for the teaching of physical education. Teaching assessment differed from other assessments, noticeably in one other way in that teaching ability in physical education was related significantly to high scores in Factor E (Assertiveness). This could be interpreted as indicating that high intelligence is not required in order to be a good teacher of physical education, but stubbornness is. These are beliefs that have been held by many non-physical educationists for many years, and the fact also revealed in this study that the higher graded physical education students do not necessarily have the higher G.C.E. 'A' level attainment is another feature that has been regarded as axiomatic by academics (Davies, 1966; Percival, 1967). However, physical educationists have tended either to ignore such criticisms, regarding them as unfounded, or have simply relied on the increasing number of physical education students with high G.C.E. attainment as evidence of the changing situation. Nevertheless, the academics' criticism will remain a valid one, regardless of the G.C.E. qualifications of the colleges' intake, if the criteria for assessing the students during the colleges' courses remain the same. Should the physical education students at College I be typical of physical education students generally in England and Wales (and it has been demonstrated in this study that they resemble physical education students in many other colleges) and should the criteria used for assessing physical education teaching ability be similar in other colleges, then it would appear that compared with the studies of the personality of successful academic subject teachers (Start, 1966a & 1968a; Warburton et al,

1963), teachers of physical education are less precise in standards, less intelligent, less conscientious, less tenderminded, less concerned about other people, and less in control of their general behaviour.

ACADEMIC STUDENTS.

Selection Procedures.

The results for the academic students at College I differed slightly from the general results and from the results for the physical education students at the same college. Reference to Table 28 will show that as in the cases of other colleges, a duplication of measurement of some student characteristics at interview appears to have occurred. An examination of the accuracy of the prediction of the students' college attainment by the five pre-college entrance grades would be a guide to which of them could be dispensed with. In fact, few of the pre-college entrance grades were very accurate, for only three out of twenty of the correlations with college final examination results were significant, and though the headmasters' assessments of students correlated significantly (at the 5% level) with students' Education examination grades, they were not designed to predict success in that subject. Similarly, the students' personality interview ratings were not significantly related to the students' teaching marks, for which purpose they were intended, though they were significantly related to students' achievements in education theory and English course examinations for which purpose they were not intended.

One unexpected feature was to be seen in a comparison between the results for the physical education and academic students at College I, for the students' G.C.E. 'A' level attainment was a very successful predictor of the college success of the former, but was not related significantly to any of the college achievements of the latter group!

TABLE 28

Relationships, indicated by coefficients of correlation, among the various measures of academic students' abilities at College I (n = 165).

VARIABLE No. AND NAME.	CORRELATIONS. 1	2	3	4	5	6	7	8	9	10	11	12	13
1. HEADMA.													
2. GCALEV.	-10												
3. INACAD.	09	** 35											
4. INPERS.	** 23	-03	** 21										
5. INPRAC.													
6. EDUCMK.	* 15	05	00	* 16									
7. TCHGMK.	02	03	00	01		13							
8. ENGMAK.	09	-03	01	* 19		** 43	13						
9. SUBSID.	-03	-10	-05	03		** 33	* 19	** 28					
10. MAINMK.	08	11	-03	09		** 39	** 32	** 20	** 32				
11. PETHEO.													
12. PEDISS.													
13. PEPRAC.													

* - significant at the 5% level.
** - significant at the 1% level.

Decimal points have been omitted.

Rejected Students.

The invalidity of the selection procedures at College I was emphasised further when details of the eventual careers of the academic subject candidates rejected by the college were examined, for the results were similar to those of the physical education students at the same college (Appendix I(B)).

67 of the 84 academic subject candidates rejected by College I successfully completed higher education courses at other institutions, and as with the physical education candidates, a large number of these achieved particular success.

Eleven obtained first degrees at universities, one staying on at his university to embark upon a Ph.D. course. This applicant Ac. 3, was graded C for academic ability during interview at College I and was apparently rejected because "his personality needs development". Ac. 2, a secondary-modern school product, had not obtained the college of education minimum entrance qualifications yet he was called for interview, he was graded D for academic ability and rejected as "very mediocre", nevertheless he was subsequently admitted to a university where he obtained an honours degree. Ac. 6, another candidate graded D for academic ability, also obtained a university honours degree. Only one student obtained an E grade at interview at College I, Ac. 7 in personality was apparently "lacking in perception", nevertheless he obtained a II 1 university degree in his main subject. The personality marks tended to be lower overall than the academic ability marks, suggesting that the interviewing lecturers were not affected by candidates' academic ability. Ac. 5 obtained a B grade for personality, but the interviewing tutor decided that Ac. 5 was "poor in examinations" and rejected his application for a place at the college; however, Ac. 5 went on to collect three more G.C.E. 'A' level examination passes that year with grades sufficiently high to admit him to university, there he completed the degree examinations successfully and obtained a II 1 class degree. The highest grading for academic ability (B) was awarded by College I to Ac. 11 who in

fact achieved the lowest number of G.C.E. passes of these eleven students.

After rejection by College I, ten further students were admitted to polytechnics to pursue their studies. Only one was graded E at the college interview; Ac. 15 was given an E for personality presumably because of his "poor voice", the two 'A' level passes he had obtained before being interviewed did not persuade the college tutors to admit him, neither did the three 'A' level passes obtained by Ac. 21 who also failed on personality grounds. Though graded D and described as "limited", Ac. 20 successfully passed three G.C.E. 'A' level examinations and completed a law degree. All these students obtained G.C.E. examination qualifications superior to those of the majority of students who attend colleges of education, but their marks for "personality" were all below average, that is the education department staff considered that they were not potentially good teachers. It is valid to note at this point that the correlation between these personality interview ratings and the teaching marks of those students admitted to the college was 0.01 only.

Seven students refused places at College I were admitted to other colleges of education and obtained certificates of education and B. Ed. degrees. Ac. 24 was awarded the lowest grade (D) at interview at College I for academic ability, he obtained the best G.C.E. qualifications at the end of that academic year, however. The majority of these students obtained C grades (that is "average" assessments, for E and D are regarded as "failure" or "weak" marks), nevertheless they were not regarded as suitable for the courses provided at College I, so they achieved their ambitions elsewhere.

Thirty-nine academic subject students rejected by College I entered other colleges of education and became qualified teachers. Only two of them had obtained any G.C.E. 'A' level examination passes before they attended the interviews, Ac. 31 had two 'A' level passes and was graded D for academic ability by College I, Ac. 29 had only one pass but was graded C-. The highest academic ability grade (C+) was awarded to Ac. 63 and Ac. 65, neither

of whom had successfully passed any G.C.E. 'A' level examinations! There were no E grades awarded by College I tutors; only eleven of the thirty-nine failed to obtain any G.C.E. 'A' level passes by the end of that academic year, but the clue to their not being accepted is the fact that their grades for personality were all average or below. The C- grade and the "uncertain vocal quality" of Ac. 29 did not prevent him from obtaining two credits in his certificate of education course at another college. Ac. 42's C- grade and his "shy, hesitant speech" did not prevent him from obtaining one distinction and one merit in the examinations at another college, while the C- and "superficiality" of Ac. 48 was no obstacle to prevent him obtaining a "distinction" certificate of education at another college of education. Ac. 47, though gaining average interview grades was rejected because "he could be a source of trouble", the factors upon which this opinion was based were not revealed in the interview report.

Twelve students entered the professions after their rejection by College I, and it is in this group that we first encounter many E grades. Ac. 71, a secondary-modern schoolboy with two G.C.E. 'A' level passes acquired before being interviewed was graded E for academic ability, he was also given an E for personality and described as having "no apparent potential", Ac. 71 is now embarked on a career in banking. Another "double E" (grades for academic ability and personality) were obtained by Ac. 70, but at the end of that academic year he had passed four G.C.E. 'A' level examinations, despite the "no enthusiasm" comment about him, and he chose a career in computer science. Though the average academic grade awarded was D+, only four of these students failed to pass any G.C.E. 'A' level examinations, and overall they were superior in G.C.E. attainment to those who were accepted at College I.

The five who went into other occupations after being rejected by College I achieved grades of only just below average standard at their interviews, only two out of ten grades being in the D category. Their academic attainment prior to interview included no G.C.E. 'A' level examination passes, yet all

were graded in the C category, with only three of them passing G.C.E. 'A' level examinations later that year. Nevertheless, they either failed to obtain a place elsewhere or decided not to enter higher education courses.

Thus, it must be concluded that the academic tutors at College I were not very accurate in differentiating between potentially good and not-so-good students, for the relationships between students' interview ratings and their college examination results were not above the chance level of success. Furthermore, the majority of the rejected candidates obtained degrees or teaching certificates at other institutions of higher education. Though it may be accepted that the prediction of performance in practical teaching and academic courses of study is a somewhat difficult task, the fact is that the staff at College I were prepared to attempt to do just that, therefore the elaborate selection procedures they organised must be regarded as having failed to distinguish between good and poor academic and teaching potential.

The College Examinations.

The academic student who performed well in one aspect of the College I course tended also to perform well in most other aspects, thus following the pattern of the general results and the results for the physical education students at the same college. The noticeable exceptions at College I were that academic students' teaching marks were not correlated significantly with their grades for education theory or for English. Though many academics might have expected this to be a feature of physical education students, it is suggested that not many of them would have expected it to be true of academic students. It must be assumed that academic subject tutors were more inclined to award the high teaching marks to those students who were more proficient in their main subject and not to those who were the most accomplished in English or education theory studies.

Further Comparisons of Physical Education and Academic Students.

Comparisons of the achievements of the physical education and academic students at five colleges were made by means of the t-test (Appendix B), and significant differences were observed between the mean scores of the two groups in the English and subsidiary subject marks, teaching marks and main subject marks. This suggests that in addition to the academic and physical education lecturers awarding different ranges of scores to their respective students, independently English and subsidiary subject department tutors perceived differences in the two groups of students.

The results for College I were similar to the general results except that further significant differences between the mean scores of the two groups were observed in respect to headmasters' assessments and education theory examinations. In fact, over 80% of the physical education students obtained A or B grades in their headmasters' assessments of their teaching potential, while only 60% of the academic students obtained A or B grades. This being a popular college for physical education course applicants, this feature could reflect the different criteria of selection, i.e. the physical education department was able (or preferred) to accept only those candidates who obtained high grades in the headmasters' assessment, while the academic subject departments in order to take in their quota of students had to accept students whose teaching potential was graded at the average or below average level.

Among the assessments made of the students at College I, noticeably approximately 58% of the physical education students obtained A or B grades for education theory examinations, whereas only 47% of the academic students obtained A or B grades in the same course, all the assessing being done by education staff, and if this situation were to exist in all of the colleges, then many of the critics of physical educationists in the past would no doubt be surprised. However, in the other colleges generally the academic students obtained the higher scores in the education theory examinations.

When assessing teaching ability, the physical education lecturers at College I tended to award more A and B grades to physical education students for the teaching of physical education than did the academic subject tutors to the academic students for the teaching of academic subjects, and this follows the pattern of the general results for all colleges. Similarly, while 73% of the physical education students obtained A or B grades for their main subject, the academic subject tutors awarded A or B grades to only 46% of the academic students, and this feature also applied to the general results. The interpretation could be that over the three years examined, a particularly good group of students passed through the physical education department, or the physical education examinations were particularly easy, or the physical education lecturers tended not to be aware of or preferred to ignore the "normal distribution curve" as a guide in their marking.

SUMMARY.

The results for College I indicate that the selection procedures for physical education and academic students were scarcely more accurate than a chance level of success. Furthermore, the achievement of a high percentage of the rejected physical education and academic subject candidates was above average. While those physical education students who were selected for the college and who achieved high marks in that subject tended to obtain low marks in the academic area of the course, suggesting that intellectual and physical skill ability were not mutually dependent.

But success in the college examinations seemed to be related to future professional advancement, in that the high examination achievers among the physical education students were those who tended to become lecturers and inspectors of physical education. Additionally, the personality of the more successful physical educationists could be described as extraverted and tending towards stability and toughmindedness - an entirely opposite profile to that of "good" academic subject teachers described in other researches.

Therefore, not only were the sellection procedures at College I invalid, they tended to favour the physically--clever, extraverted, toughminded student in preference to the intellectually-endowed, introverted, tenderminded candidate, and thus reinforced entrenched attitudes towards physical education. Because those physically-clever, extraverted physical educationists who became college lecturers seem to have perpetuated a system of selecting students in their own image which would appear to be inappropriate in the present times of change in education..

5.2

Of the other colleges, the results for students at Colleges III, V and VI (Appendices FII(E) & (F), FV(E) & (F), FVI(E)) indicate that they were similar to the general results described in Chapter Four. However, the remaining colleges included features which were worthy of further attention and comment.

COLLEGE II.

Physical Education Students. (Table 29).

The students' practical physical education interview grades correlated negatively (significant at the 5% level) with students' final physical education theory examination marks. In fact, with six out of eight of the college assessments, the students' practical interview scores were negatively correlated, the six being in courses where intellectual ability would have been required (education theory, English, subsidiary subject, physical education theory, physical education dissertation and overall physical education mark), whereas the two positive (not significant) correlations were with physical education teaching marks and students' physical education practical games course marks, both of these being assessed by physical education lecturers.

The two inevitable conclusions to be drawn from these features are first, that the good practical physical education performer was the least likely to perform well in situations where intellectual effort was required at College II, and secondly that those students rejected because of poor practical interview test scores may well have been more successful in the academic aspects of the course if they had been offered places at College II.

Academic Students. (Table 30).

The only academic student assessment with which the G.C.E. attainment did not correlate significantly was the students' teaching ability marks with which, though not significant, there was a negative correlation. Thus at College II, the better academic subject teachers were not the higher G.C.E. achievers.

TABLE 29

Relationships, indicated by correlation coefficients, among the various measures of physical education students' abilities at College II. (n = 106).

VARIABLE No. AND NAME.	CORRELATIONS. 1	2	3	4	5	6	7	8	9	10	11	12	13
1. HEADMA.													
2. GCALEV.	11												
3. INACAD.	15	-01											
4. INPERS.	03	10	17										
5. INPRAC.	-10	04	10	** 59									
6. EDUCMK.	12	** 38	09	-08	-05								
7. TCHGMK.	16	17	08	07	01	** 32							
8. ENGMAK.	-01	** 28	17	03	-11	** 45	** 30						
9. SUBSID.	06	* 22	08	-00	-01	** 36	11	** 34					
10. MAINMK.	14	17	04	04	-13	** 53	** 28	** 27	** 26				
11. PETHEO.	15	* 23	02	-06	* -23	** 57	** 27	** 31	** 37	** 71			
12. PEDISS.	-01	08	00	-09	-12	** 38	* 25	** 26	17	** 64	** 33		
13. PEPRAC.	* 25	18	05	* 22	12	19	** 27	18	10	** 42	** 35	16	

* - significant at the 5% level.
** - significant at the 1% level.

Decimal points have been omitted.

TABLE 30

Relationships, indicated by correlation coefficients, among the various measures of academic students' abilities at College II. (n = 104).

VARIABLE No. AND NAME.	CORRELATIONS. 1	2	3	4	5	6	7	8	9	10	11	12	13
1. HEADMA.													
2. GCALEV.	** 28												
3. INACAD.	17	** 22											
4. INPERS.	* 24	** 27	** 26										
5. INPRAC.													
6. EDUCMK.	10	** 29	16	* 21									
7. TCHGMK.	* 22	-03	* 21	13		* 24							
8. ENGMAK.	19	** 42	13	16		** 33	13						
9. SUBSID.	19	* 25	16	* 20		12	16	** 33					
10. MAINMK.	14	* 21	* 24	* 20		** 26	** 40	12	* 24				
11. PETHEO.													
12. PEDISS.													
13. PEPRAC.													

* - significant at the 5% level.
** - significant at the 1% level.

Decimal points have been omitted.

5.3 COLLEGE IV.

Physical Education Students. (Table 31).

The significant negative relationship between the headmasters' assessments of candidates and the candidates' personality interview ratings suggests that the headmasters and the college's physical education department staff were in complete disagreement about the type of person who was likely to become a good teacher of physical education. Furthermore, as College IV tended only to accept those candidates who obtained the higher grades in the headmasters' assessments, statistically speaking there was a likelihood that those candidates who were not offered an interview would possibly have achieved higher personality interview grades if they had attended the interviews!.

A clue to whether the college staff or the headmasters were the better predictors of teaching performance is to be seen in the significant negative relationship between students' teaching marks and the grades awarded to them at personality interviews. That is, when the physical education staff assessed teaching potential at interviews, and towards the end of the students three-year course when the actual teaching ability was assessed, an entirely opposite conclusion was reached.

Academic Students. (Table 32).

The most accurate predictor of the students' college success in the examinations was the practical interview grade. However, this practical interview was a demonstration of the students' handicraft skill, therefore it is not surprising to see that the marks awarded correlated significantly with handicraft students' teaching of handicraft marks and with the marks awarded to the students in their final examinations in handicrafts.

TABLE 31

Relationships, indicated by correlation coefficients, between the various measures of physical education students' abilities at College IV. (n = 130).

VARIABLE No. AND NAME.	CORRELATIONS. 1	2	3	4	5	6	7	8	9	10	11	12	13
1. HEADMA.													
2. GCALEV.													
3. INACAD.	15												
4. INPERS.	* -19		01										
5. INPRAC.	08		-14	05									
6. EDUCMK.	-04		00	15	05								
7. TCHGMK.	12		16	* -17	02	16							
8. ENGMAK.													
9. SUBSID.	07		** 24	-13	02	* 20	** 28						
10. MAINMK.	12		05	-02	05	** 24	* 21		16				
11. PETHEO.													
12. PEDISS.													
13. PEPRAC.													

* - significant at the 5% level.
** - significant at the 1% level.
Decimal points have been omitted.

TABLE 32

Relationships, indicated by correlation coefficients, among the various measures of academic students' abilities at College IV. (n = 62).

VARIABLE No. AND NAME.	CORRELATIONS. 1	2	3	4	5	6	7	8	9	10	11	12	13
1. HEADMA.													
2. GCALEV.													
3. INACAD.	** 35												
4. INPERS.	-02		-09										
5. INPRAC.	-02		-01	09									
6. EDUCMK.	03		17	11	-15								
7. TCHGMK.	09		18	02	* 25	20							
8. ENGMAK.													
9. SUBSID.													
10. MAINMK.	-06		-06	-13	** 44	** 40	11						
11. PETHEO.													
12. PEDISS.													
13. PEPRAC.													

* - significant at the 5% level.
** - significant at the 1% level.

Decimal points have been omitted.

5.4 COLLEGE VII.

Physical Education Students. (Table 33).

Of the pre-college entrance grades it was possible only to refer to students' practical physical education interview scores in the records at College VII, and these appeared to be significantly related to students' education marks, subsidiary subject marks, teaching marks and the overall main subject marks of the students. But in view of the nature of the data collected, the fact that subsidiary subject at this college was the scientific aspects of physical education (the main subject being the philosophical aspects), and the involvement of the same physical education lecturers in the assessing of most of these student measures, these results cannot be regarded necessarily as indicative of successful prediction of students' college achievements, and a further, more detailed examination would need to be made at this college before such conclusions could be drawn.

One feature worthy of note however is that it may be necessary for the staff at College VII to consider whether such a heavily physical education-biased course is in the best interests of their students who may wish in future years to transfer to other areas of teaching.

TABLE 33.

Relationships, indicated by chi-square values, among the various measures of physical education students' abilities at College VII. (n = 79).

VARIABLE No. AND NAME.	CHI-SQUARE VALUES.												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1. HEADMA.													
2. GCALEV.													
3. INACAD.													
4. INPERS.													
5. INPRAC.													
6. EDUCMK.					* 5.19								
7. TCHGMK.					** 7.73	* 6.02							
8. ENGMAK.													
9. SUBSID.					** 17.48	** 31.78	** 8.57						
10. MAINMK.					** 26.16	** 10.98	** 10.99		** 23.15				
11. PETHEO.													
12. PEDISS.													
13. PEPRAC.													

* - significant at the 5% level.
** - significant at the 1% level.

5.5 COLLEGES VIII, IX AND X.

Physical Education Students. (Tables 34, 35 & 36).

None of the pre-college entrance grades were significantly related to the students' college achievements, and the students' final examination results were not all significantly interrelated. However, the paucity of the data collected would suggest that a more detailed examination of the records would be required before firm conclusions could be drawn about the colleges' selection procedures and methods of assessment. One common feature of these colleges compared with the other colleges was that the availability and retention of student records did not appear to indicate that the colleges' staffs attached great importance to the value of easy reference to them.

TABLE 34.

Relationships, indicated by chi-square values, among the various measures of physical education students' abilities at College VIII. (n = 65).

VARIABLE No. AND NAME.	CHI - SQUARE VALUES.												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1. HEADMA.													
2. GCALEV.													
3. INACAD.													
4. INPERS.	0.14												
5. INPRAC.	0.00			** 8.06									
6. EDUCMK.	0.00			0.00	0.00								
7. TCHGMK.	0.35			0.14	0.13	0.00							
8. ENGMAK.													
9. SUBSID.	0.24			1.02	0.21	0.00	0.01						
10. MAINMK.	1.09			0.21	3.15	0.00	2.08		3.77				
11. PETHEO.													
12. PEDISS.													
13. PEPRAC.													

* - significant at the 5% level.
** - significant at the 1% level.

TABLE 35.

Relationships, indicated by chi-square values, among the various measures of physical education students' abilities at College IX. (n = 98).

VARIABLE No. AND NAME.	CHI-SQUARE VALUES.												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1. HEADMA.													
2. GCALEV.													
3. INACAD.													
4. INPERS.													
5. INPRAC.													
6. EDUCMK.					0.11								
7. TCHGMK.					0.74	0.88							
8. ENGMAK.													
9. SUBSID.													
10. MAINMK.					1.90	0.08	5.81 *						
11. PETHEO.													
12. PEDISS.													
13. PEPRAC.													

* - significant at the 5% level.
** - significant at the 1% level.

TABLE 36

Relationships, indicated by chi-square values, among the various measures of physical education students' abilities at College X. (n = 117).

VARIABLE No. AND NAME.	CHI-SQUARE VALUES.												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1. HEADMA.													
2. GCALEV.													
3. INACAD.													
4. INPERS.													
5. INPRAC.													
6. EDUCMK.					2.18								
7. TCHGMK.					0.85	3.28							
8. ENGMAK.													
9. SUBSID.					2.40	* 5.43	0.06						
10. MAINMK.					1.61	** 15.57	** 18.05		1.07				
11. PETHEO.													
12. PEDISS.													
13. PEPRAC.													

* - significant at the 5% level.
** - significant at the 1% level.

5.6 SUMMARY.

An examination of the results shows that each individual college adopted its own methods of selection and assessment of students. Though generally these methods at the various colleges were similar, they contained different emphases when compared with one another. Furthermore, within individual colleges some differences were observed between the results for physical education and academic students.

The results for Colleges III, V and VI were similar to the general results reported in Chapter Four. On the other hand, Colleges VII, VIII, IX and X differed from all of the other colleges particularly in one respect, that is in the retention of students' records. At these four colleges, difficulty was encountered in collecting sufficiently accurate data to test the reliability and validity of the colleges' methods of selection and assessment. This applied not only for the purpose of this research, but also to the staff of those colleges should they have wished to have carried out a similar investigation to ascertain the efficacy of their assessments of students' abilities.

Idiosyncratic features of selection and assessment methods were observed in the remaining colleges. For instance at College I, G.C.E. 'A' level results were reliable predictors of physical education students' college examination success, but unreliable guides to academic students' college success. The physical education students' practical interview scores at College II negatively correlated with six out of eight of their college examination results indicating the possibility that those students rejected owing to low practical interview attainment might have fared better in the college examinations, should they have been offered a place, than those who were accepted by the college. At College IV, the physical education staff's interview assessment of students' teaching potential negatively correlated with the headmasters' assessment of students' potential;

the final examination results indicating that the headmasters' predictions were the more accurate. The "academic" students at College IV were in fact all handicraft students, and the results indicate that as was the case often in physical education, handicraft staff tended to lend greater emphasis to the importance of the practical element of the subject at the expense of the intellectual.

When combined with the findings of the general results in Chapter Four, the differences observed in the separate colleges would seem to indicate that a number of revisions are necessary in colleges' selection procedures and methods of assessment. The proposed revisions and areas of further investigation are discussed in Chapter Six.

CHAPTER SIX.

CONCLUDING DISCUSSION.

"What we should aim at producing is men
who possess both culture and expert
knowledge in some special direction".

A.N.WHITEHEAD, Aims of Education, page 1.

6.1 PREVIOUS RESEARCH.

This research was initiated with the intention of comparing the methods of selection and assessment of physical education students with students of other subjects at ten selected colleges of education in England and Wales. Permission was obtained to examine the student records at the ten colleges, but because complete records were not maintained at some of the colleges, the study was mainly confined to data relating to 1163 physical education students at the ten colleges and 554 students of other subjects at five of the same colleges.

Previous research in this field of study tended to suggest that:

(a) methods of selection of college students were generally unreliable and invalid;

(b) methods of assessing and examinations for students in colleges were of doubtful validity;

(c) methods of assessing teaching ability differed, dependent upon the nature of the children taught, the nature of the subject taught, the ages of the children taught, the qualifications of the assessing tutor, and other factors;

(d) personality measurement of physical education students tended to show that they were Extraverted, Stable and Toughminded;

(e) personality measurement of successful 'academic' subject teachers tended to show that they were Introverted, Highly Anxious and Tenderminded;

and (f) academic subject teachers' success in their careers after leaving college was unrelated to the assessment of their competence as teachers when they were students.

Despite the findings of the previous researches, the ten colleges still adhered to the selection procedures they had been using for many years, the students admitted to them were required to sit final examinations, and teaching marks on a five-point scale were awarded.

6.2 FINDINGS OF THE PRESENT INVESTIGATION.

In examining the selection methods and the assessment of physical education students used in this research, similar results were discovered to those previous investigations which had concentrated on academic subject students. Additionally, some features specific to physical educationists were also found from which in view of the small sample, firm conclusions were not drawn, but which seem to warrant further investigation:

(a) The G.C.E. 'A' level attainment of both physical education and academic subject students was the most accurate predictor of the students' success in the college examinations.

(b) Headmasters' assessments of students' potential as teachers were not significantly related to students' overall college attainments, though they were more accurate predictors of academic subject students' teaching marks than were the colleges' personality interview grades.

(c) College interviews generally were of low predictive value in relation to the college performances of both physical education and academic subject students, and in particular the physical education practical interview tests appear to have been a main factor that rejected many potentially good students.

(d) Over 80% of the students rejected by one college were successful in degree, degree-equivalent and teacher-training courses at other institutions of higher education.

(e) At the colleges, the assessment of physical education and academic subject students differed in that physical education students tended to obtain significantly higher grades in personality interviews, teaching marks and main subject examinations; whereas the academic subject students scored significantly higher in English and subsidiary subject examinations.

(f) The physical education students who obtained high marks in the physical education final examinations at college tended also to obtain high scores on Cattell's 16.P.F. Second-Order Personality Factors, Extraversion, Stability and Toughmindedness.

(g) The physical education students who fared well in the physical education examinations at college tended to be in lecturing and inspectors' posts ten to twenty years after leaving college, whereas those students who obtained low college examination scores tended to be in schoolteaching posts.

6.3 RECOMMENDATIONS FOR THE FUTURE.

A number of recommendations can be made resulting from the findings of this research and in particular:

(a) proposals for future research in this field,

(b) proposals for further selection and assessment of teacher-trainees,

and (c) proposals for consideration by physical educationists.

(a) Future Research.

(i) A similar investigation to this present study should be carried out to determine how similar the situations is for

women physical educationists, for the limited research available tends to suggest that the selection procedures and methods of assessment of men and women physical educationists may well be similar and in need of revision.

(ii) A more thorough examination should be made of the reliability and validity of the practical interview tests used for physical education candidates at all colleges, for the present research suggests that not only are they unreliable, but they prevent potentially good students from attending physical education courses.

(iii) An evaluation should be made of the practical physical education courses in the colleges in relation to their relationships to successful physical education teaching, for though the physical education teacher in the past may have been required to be physically fit to demonstrate physical activities, present-day teaching demands the presence of intelligent teachers who are sympathetic to the needs and interests of the children and not simply good athletes or games players.

(iv) This present research and previous studies have indicated that the theory courses for physical educationists are heavily biased towards such subjects as anatomy and physiology, which may not necessarily be particularly relevant to the needs of present-day teachers. Therefore a long-term study should be planned to collect from the colleges more detailed information of the theory courses, especially for "advanced main" subject physical education students. There should be an evaluation of the courses, with the aims of the lecturers who planned the courses and their criteria used in the assessing of students being examined.

(v) There should be a comparative study of the teaching

effectiveness of introverted and extraverted physical educationists, for the former tend to be at a disadvantage compared with the latter when physical education lecturers are assessing them. If it could be shown that introverted physical education teachers are equally (or more) effective teachers of the subject, then lecturers should be made aware of this so that the selection procedures and methods of assessing could be revised.

(vi) Comparative physical education is not a subject to be found in most of the physical education courses at the colleges in England and Wales. Until British research findings are available to assist colleges in their revision of physical education courses, it might be advantageous to examine physical education in other countries, for not only would it be of value to physical education students, but the lecturers might also see some features worthy of inclusion in courses in this country.

(vii) There should be more follow-up studies of the careers of physical education teachers relating to their academic qualifications, college achievements and personality. It would appear that in recent years the rewards have been more readily available for the physically-clever physical educationists in respect to selection for the college courses, in the college final examinations and in their later careers. This situation may have resulted in the physical education fraternity becoming too prejudiced to consider wisely the value of permitting the attendance on physical education courses in colleges of people unlike themselves in nature and ability.

(viii) Though difficulty may be encountered in defining a "good" or an "ideal" physical education teacher, nevertheless it might

prove valuable to compare the findings of two investigations. First, in cooperation with local education authority physical education inspectors, an investigation that looks carefully at those teachers regarded as successful physical education practitioners. Secondly, a separate investigation that looks carefully at the functions that an "ideal" physical education practitioner might theoretically be expected to perform. From the results, it might be possible to work back to a detailed rating scale based on the features of a "good" physical education practitioner, and these scales could be used in physical education teacher-training institutions and be revised regularly in the light of changing needs in schools.

(b) Teacher Training.

(i) College staffs should take note of the research that has been published on selection, and in particular the consensus of opinion that selection procedures for colleges are inaccurate.

(ii) Should colleges decide that they wish to continue to interview students, then the staff should agree upon criteria for selection with reference to the students' future occupations, they should discuss how these could best be put into practice, then ensure that all interviewing staff be made aware of them.

(iii) There should be attempts to standardize the interviews so that only a small group of interviewers were involved, and preferably the interviews should not be spread over many weeks in the year.

(iv) There should be continual evaluation and revision of the accuracy of the selection procedures by reference to students' college performances and eventual career advancement, as well as to referring to results of research published on the subject.

(v) Concurrent with adopting the foregoing procedures, an experiment should be carried out by admitting a group of say 25% of a college's intake in one year without interviewing them. An offer of a place to the candidates could be based on favourable headmasters' reports as to their personality, signs of their application to academic study as evidenced by their G.C.E. attainment, and by reference to their wide interests and involvement as illustrated in their letters of application. Should this experimental group of students prove to be as successful in their studies as those accepted after interviews, then an obvious conclusion would need to be drawn by the college staffs.

(vi) Details of the content of present-day college courses and the selection methods are not always available to intending applicants and their schools. Colleges and departments within colleges lend different emphases to academic study and pedagogical training, and tend also to use different criteria in selection and assessing of students. Colleges should ensure that their brochures make clear to candidates what the nature of courses are, the criteria used in the selection of students, and the methods of assessment employed during the course. Then candidates would be able to guage their chances of being admitted to the various colleges and decide whether or not they would wish to be admitted to the particular types of courses offered.

(c) Physical Education.

(i) In recent years, despite many changes in education, it would appear that physical educationists have continued to over-emphasise the value of physical activity at the expense of

intellectual effort in their college courses. There should be a comprehensive examination of the research findings relating to the mental, social and physiological benefits to be derived from physical activity and these should be reflected in college courses so that physical education theory does not consist predominantly of anatomy and physiology and similar studies.

(ii) Physical education teachers should be encouraged to revise constantly their aims and objectives in relation to the changing needs and interests of the children whom they teach, the facilities available in their locality, the changing needs of the society in which they find themselves, and the findings of up-to-date researches.

(iii) The physical education teacher-training institutions should consider whether their subject is one which is best taught by physically-clever, extraverted young men. If they decide that this be so, then they need also to consider whether they should ensure that the students whom they teach are well prepared for alternative occupations when age prevents them from remaining physically active.

(iv) Should the colleges discover that many different types of people teach physical education effectively, then there would be a need for a revision of the presently used selection procedures, the content of the courses, and the methods of assessment employed for physical education teacher-trainees.

(v) There are many different organisations to which physical educationists may belong, for instance there are associations for university physical education lecturers, organisers and college lecturers, public schools' physical education teachers, and "The Physical Education Association" which caters for all

but which the majority do not join. Additionally, there appears often to be a conflict among those physical educationists whose interests lie in sports coaching, those whose interests lie in research, and those to whom the teaching of children is of paramount importance. Physical educationists should realise that the future of those employed in the subject depends upon cooperation and an interchange of ideas among these different factions, for physical educationists and the value of their contributions in education are still viewed with suspicion by many laymen and academics, and the findings of this present research would not help to allay these suspicions.

APPENDICES.

APPENDIX A.

List of colleges offering "advanced main" level courses in physical education for men students

(c. A compendium of teacher training courses, 1969, Dept. of Ed. and Science, H.M.S.O., Page 33).

Borough Road College (London),

Chester College,

City of Cardiff College,

City of Leeds and Carnegie College,

Loughborough College of Education,

Madeley College of Education (Nr. Crewe),

St. John's College (York),

St. Luke's College (Exeter),

St. Mary's College (London),

St. Paul's College (Cheltenham).

APPENDIX B(I).

Details of the visit to and information collected from

COLLEGE I.

PHYSICAL EDUCATION STUDENTS (n = 138, total population).

Pre-College Entrance Variables.

1. The headmasters of those pupils in England and Wales who apply for admission to colleges of education are requested to grade the pupils on a five-point scale in relation to the pupils' potential as teachers. Grades are awarded as follows: A - Very Good: B - Good; C - Average; D - Fair; E - Very Poor.
   The grades obtained by all of the students were obtained.
2. The number of G.C.E. 'A' Level examination passes that the students obtained by the time they entered college were noted.
3. The interview procedures at this college included a discussion of approximately twenty minutes duration with a senior member of the physical education staff who perused the students' academic records and letters of application, discussed the students' reading habits and interests, then awarded a grade to the students on a five-point scale from A down to E, this was intended as a prediction of the students' potential in academic studies during a three-year course. The grades obtained were noted.
4. At this college, a senior member of the Education department staff spent about twenty minutes in discussion with each applicant about their reasons for wishing to become teachers, the nature of their school clubs and societies involvement, and their other interests. Grades on a five-point scale were awarded to students from A down to E, these being marks for "personality" and were intended as a prediction of the students' potential as teachers.
5. A series of practical tests in the gymnasium were given to all students. The colleges' staff considered that physical skill, strength, endurance and joint mobility were necessary to endure the practical work during the three-year course, and were of the opinion that there was a relationship between good practical performance and teaching ability in physical education. The tests and scoring were devised by the colleges' physical education staff and consisted of:
   i) Agility Run. A zig-zag sprint around medicine balls laid in a particular pattern on the gymnasium floor. Marks were awarded in relation to the speed of the run.
   ii) Mobility Test. A score allocated in relation to the student's ability to perform a "crab" and a sitting down toe-touching exercise.
   iii) Chins. Marks were awarded in relation to the number of times a student could touch the beam with his chin from a hanging, arms fully extended position.
   iv) Sargent Jump. Marks were awarded relative to the height that a student could project his centre of gravity in an upwards direction.
   v) Standing Long Jump. Marks were awarded for the distance one could long jump from a standing position taking off two feet.

An aggregate percentage score was obtained and converted into a literal grade from A down to E, both were extracted from the files for this research.

Colleges' Assessments Variables.

6. The Education department awarded students marks for their performances during the three years of the study of Education. These were available both as percentages and as literal grades, both were extracted from the files.
7. Teaching marks were awarded to students on a five-point scale from A (Excellent) down to E (Failure). This mark determines the eligibility of a person to be employed as a teacher in any type of educational institution, teaching any subjects, with any age-range of pupils. However in this college, a student's mark for teaching was based mainly on his performance in the teaching of physical education to secondary school boys. The marks were noted.
8. This college was a member of a university institute of education all students of which were required to attend a one-year course in their colleges' English departments. Marks were awarded for the student's performance on this course and were available in percentages and literal grades.
9. Students at this college attended a two-year course in a subject other than their main course. The "subsidiary" or "second" subject course tutors awarded the students a mark based on their performance during the two years. These were available both as percentages and literal grades.
10. A main subject mark was awarded at this college based on an average of three scores (variables 11, 12, and 13). This was available as a percentage and literal grade.
11. A final examination mark for physical education "theory" was calculated from results on papers for "principles of physical education", "method" and "anatomy and physiology". This was available as a percentage and literal grade.
12. During the third year of his three-year course, a student was allocated time-table time each week to pursue an independent study of his own choice in physical education. At the end of the year he was required to submit a written dissertation on his chosen topic for which he was awarded a score as a percentage and this was available also as a literal grade.
13. At the end of their third year, physical education students underwent practical tests in the various games, athletics, swimming and gymnasium activities. A total percentage was constructed for the students' "practical ability", this was also available as a literal grade.

Personality Variables.

14 - 32 inclusive. Owing to time and organisation problems, only the total populations of two years (those entering the college in 1968 and 1969, n = 94) of the physical education students at this college were used in this part of the research. The 16 Personality Factor Questionnaire, Form A, of Cattell and Eber (1964 & 1970) was administered to each group of students separately in their final term of their course. Kane (1968, page 2) stated that there was no demonstrable change in the personality profile of physical education students over a three-year period in a college of education, but in this research it was decided to test the students at as near as possible exactly the same week of their three-year course.

The week chosen was immediately prior to their final examinations when some areas of their courses were completed thus time was available,

and also it was put to the students as a useful exercise in rehearsing "examination conditions" of sitting down without conversation and completing a test previously unknown to them.

Post-College Variables.

33. In view of the volume of work involved, the "follow-up" section of this research was confined to this college and to students who had left the college between ten and twenty years previously. A random sample of 25% of the students' records were extracted from the files, an enquiry was made of the students' present occupations and the result was a return of 66.6% of the sample. (i.e. 16.7% of the total students). The information available was:
    i) The student's score for "Practical Ability" achieved during his interview prior to arriving at the college.
    ii) The student's score for "Personality" achieved during his oral interview prior to arriving at the college.
    iii) The teaching mark awarded to the student at the end of his course and concerned solely with his performance in the teaching of physical education.
    iv) The student's final mark obtained for practical ability in games, gymnastics, swimming, etc.
    v) The student's percentage mark awarded in his final examination in "the principles of physical education".
    vi) The student's percentage mark obtained on the final examination paper on "method".
    vii) The percentage obtained by the student in his final examination on "anatomy".
    viii) The percentage gained by the student in his final examination paper on "physiology".
    ix) The final mark awarded to the student for his overall performance on the course in physical education.
34. The total population of students who were interviewed for physical education places in 1965, 1966 and 1967 but who were rejected as unsuitable candidates (n = 172) were sent a questionnaire (Appendix B) to elicit how they fared in their search for entry into other educational establishments or professions subsequently.

ACADEMIC STUDENTS (n = 165, total population).

Pre-College Entrance Variables.

1. The headmasters' forecasts of the students' potential as teachers were obtained in grades ranging down from A to E.
2. The number of G.C.E. 'A' level examination passes that the students had obtained prior to their arrival in the colleges were noted.
3. The interview procedures consisted of marks awarded by senior members of the students' main subject department, these were the result of a twenty minute discussion of the students' achievements to date and reasons for their interest in the main subject of their choice. The marks were noted.
4. The "personality" interview consisted of a twenty minutes discussion with a senior member of the Education department. Marks were awarded in relation to tutors' assessments of the students' potential as teachers.
5. No practical physical education test was administered to academic students.

Colleges' Assessments Variables.

6. An Education theory mark was available in percentage form and as a literal grade which was awarded to students for their performance in the three-year study of Education.
7. A teaching mark was awarded as a literal grade from A down to E which represented the Students' ability mainly in classroom situations in academic subjects. This qualified the teachers to teach subjects other than their own main subject.
8. An English mark was awarded for students' performance in the compulsory one-year course.
9. A mark was awarded as a result of students' performances over two years in a subject other than their main subject. This was the "subsidiary subject" mark and it was noted.
10. The main subject mark was available in percentages and literal grades, though the criteria differed among the various academic subjects departments.

11, 12 and 13. These physical education assessments did not apply to the academic students.

14 - 32 inclusive. Time prevented the personality testing of the academic students.

33. The amount of work involved precluded a follow-up study of the academic students of this college.

34. The total population of students who were interviewed for academic subject places in 1965, 1966 and 1967 but who were rejected as unsuitable candidates (n = 168) were sent a questionnaire (Appendix B) to elicit how they fared in their search for entry into other educational establishments or professions subsequently.

Summary of the grades awarded to students at College I (in percentages).

(a) Physical Education Students (n= 138).

GRADES. & NUMERICAL SCORE	VARIABLES. 1. HEADMA.	2. GCALEV.	3. INACAD.	4. INPERS.	5. INPRAC.	6. EDUCMK.	7. TCHGMK.	8. ENGMAK.	9. SUBSID.	10. MAINMK.	11. PETHEO.	12. PEDISS.	13. PEPRAC.
A.(5)	20.3	10.9	2.2	1.4	5.8	4.3	8.7	1.4	5.1	17.4	9.4	13.8	11.6
B.(4)	61.6	38.4	24.6	49.3	50.7	53.6	34.1	30.4	21.7	55.8	45.7	49.3	69.6
C.(3)	17.4	27.5	65.9	48.6	43.5	42.1	54.3	63.1	55.8	26.1	42.0	36.9	18.1
D.(2)	0.7	23.2	7.3	0.7	0	0	2.9	5.1	17.4	0.7	2.9	0	0.7
E.(1)	0	0	0	0	0	0	0	0	0	0	0	0	0
MEANS	4.30	3.38	3.22	3.51	3.62	3.62	3.50	3.29	3.13	3.90	3.62	3.77	3.92
S.D.	0.38	0.96	0.60	0.53	0.60	0.57	0.70	0.59	0.77	0.67	0.70	0.67	0.57

(b) Academic Students (n =165).

GRADES.	VARIABLES. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.			
A.	12.7	20.0	0.6	1.8	-	5.5	5.5	6.7	8.4	14.5			
B.	50.3	26.1	21.2	40.6	-	41.8	29.7	30.9	21.2	32.2			
C.	33.3	28.5	72.7	57.0	-	48.5	59.3	55.7	51.6	40.0			
D.	3.7	25.4	5.5	0.6	-	4.2	5.5	6.7	18.8	13.3			
E.	0	0	0	0	-	0	0	0	0	0			
MEANS	3.72	3.37	3.17	3.44	-	3.48	3.35	3.38	3.20	3.48			
S.D.	0.73	1.11	0.51	0.55	-	0.67	0.67	0.71	0.84	0.90			
t test & with P.E. students.	8.95 1%	0.08 n.s.	0.78 n.s.	1.13 n.s.	-	1.98 5%	1.90 5%	1.21 n.s.	0.76 n.s.	4.67 1%			

APPENDIX B(II).

Details of the visit and data collected from

COLLEGE II.

PHYSICAL EDUCATION STUDENTS. (n = 106, total population).

Pre-College Entrance Variables.

1. The headmasters' forecasts of the students' potential as teachers were noted in the form of literal grades on a five-point scale, A down to E.
2. The number of G.C.E. 'A' level examination passes obtained by the students prior to entering college were noted.
3. The students were interviewed by the subject head of department and given an English essay to write. A perusal of the students' academic record to date was made and also taken into account when grading the students' "academic potential" on a five-point scale A down to E.
4. The "personality" interview consisted of a discussion of about twenty minutes duration with either the principal of the college or his deputy, and a further discussion with the head of education or his deputy. Suitability for the teaching profession was the criterion; students were graded on a five-point scale from A down to E.
5. A number of practical tests in the gymnasium were given to all applicants. They consisted of:
   i) Power Test. Marks were awarded in relation to the height that a student could propel himself in the "sargent jump".
   ii) Endurance Test. Marks were awarded for the number of times a student could touch a beam with his chin from a hanging, arms fully extended position.
   iii) Movement Task. Marks were awarded subjectively for a student's performance in carrying out a set of oral instructions which described a series of movements.
   iv) Rhythm Task. Marks were awarded subjectively for the student's attempt to emulate a movement carried out by the interviewing member of physical education staff.
   v) Vault. Marks were awarded subjectively for the student's performance over a vaulting box in a vault of his own choice. More complicated vaults warranted higher marks.
   vi) Agility. Marks were awarded subjectively for the student's performance in an agility of his own choice on the gymnastic mattress.

   The purposes of these tests were described thus:
   "to reveal a candidate's potential rather than achievement".
   An aggregate mark was calculated, the marks for the students included in this research were obtained.

Colleges' Assessments Variables.

6. Marks awarded by the Education deparment for students' performances over three years in course work and examinations were obtained in percentages and literal grades.
7. Students' teaching marks were awarded on a five-point scale A down to E. The marks were allocated by members of the physical education department and were a composite mark for teaching ability in classroom and physical education situations, but advantage was given to the physical education situation performance.
8. A compulsory one-year English course was a feature of this college. Marks were awarded for the students' performances on the course and were available in percentages and literal marks.

9. Students attended a two-year second subject or "subsidiary" course. Marks were obtained for this course in both percentages and literal grades.
10. The main subject mark was obtained from three examination results (variables 11, 12 and 13). This was available in percentages and literal grades.
11. The final examination in physical education theory was calculated from scores on papers for "principles of physical education", "method" and "anatomy and physiology". This was expressed as a percentage and literal grade.
12. Students in their final year were allocated time on the time-table to carry out an investigation in a field of their own choice. A written dissertation on their findings had to be presented. Marks awarded in percentages were obtained.
13. Towards the end of the three-year course, students were tested in the various games and practical activities which constituted their course. An aggregate "practical" mark was obtained in percentages and literal grades.

14 - 35 inclusive. These were not measured in this college.

ACADEMIC STUDENTS. (n = 104, total population).

Pre-College Entrance Variables.

1. The headmasters' forecasts of the students' potential as teachers were noted in the form of literal grades A ranging down to E on a five-point scale.
2. The number of G.C.E. 'A' level examination passes that the students had obtained prior to their arrival in the colleges were noted.
3. The students were interviewed by the subject head of department and given an English essay to write. A perusal of the students' academic record to date was made and also taken into account when grading the students' "academic potential" on a five-point scale from A down to E.
4. The "personality" interview consisted of a discussion of about twenty minutes duration with either the principal of the college or his deputy, and a further discussion with the head of education or his deputy. Suitability for the teaching profession was the criterion; students were graded on a five-point scale from A down to E.
5. No practical physical education tests were given to academic students.

Colleges' Assessments Variables.

6. Marks awarded by the Education department for students' performances over three years in course work and examinations were obtained in percentages and literal grades.
7. Students' teaching marks were awarded on a five-point scale A down to E. These marks were for the students' ability in the teaching of academic subjects in the classroom.
8. A compulsory one-year English course was a feature of this college. Marks were awarded for the students' performance on the course and were available in percentages and literal grades.
9. Students attended a two-year second subject or "subsidiary" course. Marks were obtained for students' performances on this course in both percentages and literal grades.
10. The main subject marks were available in percentages and literal grades, though the criteria differed among the various academic subjects departments.

11, 12 and 13. These physical education assessments did not apply to these academic students.

14 - 32 inclusive. Time prevented the personality testing of the students in this college.

33 - 35. These was no follow-up of sttudents from this college.

Summary of the grades awarded to students at College II (in percentages).

(a) Physical Education Students (n= 106).

GRADES.	VARIABLES. 1. HEA-DMA.	2. GCA-LEV.	3. INA-CAD.	4. INP-ERS.	5. INP-RAC.	6. EDU-CMK.	7. TCH-GMK.	8. ENG-MAK.	9. SUB-SID.	10. MAI-NMK.	11. PET-HEO.	12. PED-ISS.	13. PEP-RAC.
A.	17.9	12.3	2.8	5.7	8.5	1.9	10.4	0.9	2.8	20.8	18.9	17.9	17.0
B.	63.3	28.3	36.8	53.7	45.3	33.0	46.2	36.8	43.4	56.6	48.1	47.2	69.8
C.	17.9	28.3	46.3	36.8	37.7	63.2	39.6	58.5	47.2	19.8	29.2	27.4	13.2
D.	0.9	31.1	14.1	3.8	8.5	1.9	3.8	3.8	6.6	2.8	3.8	7.5	0
E.	0	0	0	0	0	0	0	0	0	0	0	0	0
MEANS	3.98	3.22	3.28	3.61	3.54	3.34	3.63	3.36	3.42	3.95	3.82	3.75	4.04
S.D.	0.63	1.02	0.74	0.66	0.77	0.57	0.72	0.57	0.66	0.72	0.78	0.84	0.55

(b) Academic Students (n =104).

GRADES.	VARIABLES. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
A.	17.3	14.4	4.8	2.9	-	2.9	7.7	3.8	2.9	12.5
B.	51.9	40.4	33.7	39.4	-	36.5	49.1	47.2	51.0	36.6
C.	28.8	22.1	51.9	47.1	-	57.7	39.4	49.0	37.4	39.4
D.	1.0	23.1	9.6	9.6	-	2.9	3.8	0	8.7	11.5
E.	1.0	0	0	1.0	-	0	0	0	0	0
MEANS	3.84	3.46	3.34	3.34	-	3.40	3.61	3.54	3.48	3.50
S.D.	0.75	1.00	0.73	0.72	-	0.60	0.69	0.57	0.70	0.86
't' with P.E.	1.47 n.s.	1.72 n.s.	0.59 n.s.	2.84 1%	-	0.75 n.s.	0.21 n.s.	2.30 5%	0.64 n.s.	4.13 1%

APPENDIX B(III).

Details of the visit and data collected from

COLLEGE III.

PHYSICAL EDUCATION STUDENTS. (n = 158, total population).

Pre-College Entrance Variables.

1. The headmasters' forecasts of the students' potential as teachers were noted in the form of literal grades on a five-point scale from A down to E.
2. The number of G.C.E. 'A' level examination passes obtained by the students prior to entering college were noted.
3. The interview procedures at this college did not include an assessment of the physical education students' "academic potential", this evidently was done when the students' application forms were examined by noting the students' performances in examinations to date, and by reference to headmasters' reports.
4. Students were interviewed by a senior member of the Education department who awarded subjectively a literal grade for "personality" on a five-point scale A down to E, based on the estimation of students' potential as teachers.
5. Practical tests were administered to all interviewees in the gymnasium. They consisted of:
   i) General Motor Test. Aimed to detect students' general skill ability.
   ii) Endurance. Students were awarded marks in relation to the number of "dips" they could perform on a set of parallel bars. Additionally marks were awarded for the number of "chins" they could perform on a beam.
   iii) Power. A "Sargent Jump" score was recorded.
   iv) Vault. A subjective mark was given for students' performances on a gymnastics vault.
   v) Agility. A subjective mark was given for students' performances on a gymnastics agility.
   vi) Balance. A subjective mark was given for students' ability in handstanding.
   vii Mobility. A test was given for all-round joint mobility.
   viii) Appearance. An assessment was made of students' general cleanliness, tidiness and posture.

   An overall mark was calculated for practical ability and was obtained in literal grade form.

Colleges' Assessments Variables.

6. Marks were awarded by the Education department for students' performances over three years in course work and examinations and these were obtained in literal grades and percentages.
7. Students' teaching marks were awarded on a five-point scale A down to E. The marks were allocated by members of the physical education department mainly for the students' performance in that subject.
8. There was no English course mark available.
9. Not all students opted for a second subject course, therefore no marks were collected from the records of the few who did.
10. Main subject marks were obtained in percentages and in literal grades, and represented students' performances on examinations in "theory of physical education", "anatomy and physiology" and "practical physical education".

11 - 35 were not available for this college.

ACADEMIC STUDENTS. (n = 76, 50% random sample).

Pre-College Entrance Variables.

1. The headmasters' forecasts of the students' potential as teachers were noted in the form of literal grades from A down to E.
2. The number of G.C.E. 'A' level examination passes obtained by the students prior to entering college were noted.
3. The students were interviewed by the subject head of department or his deputy and the previous academic records of the students were considered before they were assessed on a five-point scale A down to E.
4. The "personality" interview consisted of a discussion with a senior member of the Education department. Suitability for the teaching profession was the criterion; students were awarded a grade on a five-point scale A down to E.
5. There was no practical physical education test for academic students.

Colleges' Assessments Variables.

6. Marks were awarded by the Education department for students' performances over three years in course work and examinations and these were obtained in literal grades and percentages.
7. Students' teaching marks were awarded on a five-point scale A down to E for the students' performances in teaching academic subjects in the classroom.
8. There was no English course mark available.
9. Not all students attended a second subject course.
10. Main subject marks were obtained in percentages and literal grades, though subject departments varied in their criteria.

11 - 35 were not available for this college.

Summary of the grades awarded to students at College III

...

(a) Physical Education Students (n= 158).

GRADES.	VARIABLES. 1. HEA-DMA.	2. GCA-LEV.	3. INA-CAD.	4. INP-ERS.	5. INP-RAC.	6. EDU-CMK.	7. TCH-GMK.	8. ENG-MAK.	9. SUB-SID.	10. MAI-NMK.	11. PET-HEO.	12. PED-ISS.	13. PEP-RAC.
A.	17.7	3.8	-	12.0	24.0	1.9	7.6	-	-	7.0			
B.	50.0	22.8	-	58.9	41.1	13.3	31.6	-	-	43.7			
C.	30.4	22.1	-	27.2	33.6	53.8	58.9	-	-	46.8			
D.	1.9	51.3	-	1.9	1.3	29.7	0.6	-	-	2.5			
E.	0	0	-	0	0	1.3	1.3	-	-	0			
MEANS	3.84	2.77	-	3.82	3.80	2.86	3.44	-	-	3.56			
S.D.	0.73	0.94	-	0.66	0.85	0.75	0.70	-	-	0.67			

(b) Academic Students (n = 76).

GRADES.	VARIABLES. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.			
A.	11.8	10.5	6.6	9.2	-	2.6	7.9	-	-	2.6			
B.	50.0	26.3	34.2	43.4	-	23.7	18.4	-	-	25.0			
C.	35.6	22.4	51.3	34.3	-	46.1	59.2	-	-	36.9			
D.	1.3	40.8	7.9	11.8	-	27.6	14.5	-	-	28.9			
E.	1.3	0	0	1.3	-	0	0	-	-	6.6			
MEANS	3.70	3.07	3.43	3.47	-	2.94	3.20	-	-	2.92			
S.D.	0.75	1.05	0.72	0.87	-	0.72	0.78	-	-	0.95			
't' with P.E.	1.35 n.s.	2.12 5%	-	3.43 1%	-	0.79 n.s.	2.28 5%	-	-	5.30 1%			

APPENDIX B(IV).

Details of the visit and data collected from

COLLEGE IV.

PHYSICAL EDUCATION STUDENTS. (n = 130, total population in two years).

Pre-College Entrance Variables.

1. The headmasters' forecasts of the students' potential as teachers were noted in the form of literal grades from A down to E.
2. The number of G.C.E. 'A' level examination passes obtained by the students were not available in the records.
3. The interviews consisted of the students being confronted by a "general panel" of tutors who assessed the "academic ability" on a five point scale by reference to students' performances in examinations up to that date, their references, their interests and their ability to discuss a number of topics.
4. To assess "personality", students were grouped in fours and a discussion was led by a senior tutor in physical education. Grades were awarded on a five point scale A down to E.
5. Practical tests were administered in the gymnasium to all interviewees. The tests were:
   i) Ball Skill. Students were required to perform a series of skills related to ball games.
   ii) Agility. Marks were awarded for students' performances on gymnastic agilities of the students' choice.
   iii) Vault. Students were invited to demonstrate a gymnastic vault of their own choice, subjectively, their performances were marked.
   iv) Beam and rope. Students were required to attempt a number of activities using gymnasium beams and ropes.

   An overall mark was given for practical ability, the tests were designed "to give an indication of the candidate's versatility in body management and his adaptability to new skills".

Colleges' Assessments Variables.

6. Marks were awarded by the Education department for students' performances over three years in course work and examinations. These were obtained in percentages and literal grades.
7. Students' teaching marks were awarded on a five-point scale A down to E, for the students' performance in the teaching of physical education.
8. Marks were not available for an English course.
9. Students attended a two-year second subject or "subsidiary" course. Marks were obtained in literal grades for students' performances in these courses.
10. The main subject mark was obtained in the form of literal grades and was a composition of marks for examinations in the theory of physical education, anatomy and physiology and practical work.

11 - 35 were not measured at this college.

ACADEMIC STUDENTS. (n = 62, Random Sample of two years).

Pre-College Entrance Variables.

1. The headmasters' forecasts of the students' potential as teachers were noted in the form of literal grades ranging down from A to E.

2. The number of G.C.E. 'A' level examination passes obtained by the students were not available in the records.
3. The interviews consisted of the students' being confronted by a "general panel" of tutors who assessed the "academic ability" on a five-point scale by reference to students' performances in examinations up to that date, their references, their interests and their ability to discuss a number of topics.
4. To assess "personality", students were interviewed in the Handicrafts department, for all of these academic students had opted for that area of study as their main subject.
5. An assessment was made of the technical ability of the students in the main subject of their choice - handicrafts.

Colleges Assessments Variables.

6. Marks were awarded by the Education department for students' performances over three years in course work and examinations. These were obtained in percentages and literal marks.
7. Students' teaching marks were awarded on a five-point scale from A down to E for students' performances mainly in handicrafts and classroom teaching.
8. Marks were not available for an English course.
9. Students at this college who studied handicrafts as a main subject did not study a "subsidiary" subject.
10. The main subject mark was obtained in theform of literal grades and percentages, and were for performances in practical and theoretical work in handicrafts.

11 - 35 were not measured at this college.

Summary of the grades awarded to students at College IV

(a) Physical Education Students (n - 130).

GRADES.	VARIABLES.												
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
A.	36.9	-	3.8	10.0	5.4	1.5	12.3	-	2.3	7.7			
B.	52.3	-	64.6	53.1	76.2	16.2	20.0	-	18.5	27.7			
C.	10.8	-	31.6	36.9	18.4	57.7	50.0	-	50.8	43.8			
D.	0	-	0	0	0	24.6	17.7	-	28.4	20.8			
E.	0	-	0	0	0	0	0	-	0	0			
MEANS	4.25	-	3.72	3.74	3.88	2.95	3.27	-	2.95	3.22			
S.D.	0.65	-	0.53	0.63	0.47	0.69	0.90	-	0.75	0.87			

(b) Academic Students (n - 62).

GRADES.	VARIABLES.												
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.			
A.	25.8	-	3.2	0	6.4	0	9.6	-	-	4.8			
B.	52.2	-	46.8	50.0	69.4	8.1	19.4	-	-	30.7			
C.	22.0	-	50.0	50.0	24.2	58.0	56.5	-	-	50.0			
D.	0	-	0	0	0	33.9	14.5	-	-	14.5			
E.	0	-	0	0	0	0	0	-	-	0			
MEANS	4.05	-	3.53	3.50	3.82	2.74	3.24	-	-	3.26			
S.D.	0.69	-	0.56	0.50	0.53	0.60	0.82	-	-	0.77			
't' with	1.92	-	2.26	2.87	1.46	2.17	0.23	-	-	0.32			
P.E.	n.s.	-	5%	1%	n.s.	5%	n.s.	-	-	n.s.			

APPENDIX B(V).

Details of the visit and data collected from

COLLEGE V.

PHYSICAL EDUCATION STUDENTS. (n = 81, total population).

Pre-College Entrance Variables.

1. The headmasters' assessments of the students' potential as teachers were available in the form of literal grades on a five-point scale from A down to E.
2. The number of G.C.E. 'A' level examination passes that the students obtained by the time they entered college were noted.
3. The interview procedures included a discussion with a senior member of the physical education department who studied the students' academic record and oral ability and awarded a grade on a five-point scale for academic ability, or ability to cope with a three-year teacher-training course.
4. A further interview with a senior member of the Education department was included, in which the students' "personality" was subjectively rated on a five-point scale from A down to E.
5. A series of practical tests in the gymnasium were given to students during their interview:
   i) Chins. The number of times that students could touch a beam with their chins from a fully extended hanging position on the beam were noted.
   ii) Dips. The number of times that students could raise from a dipped position on the parallel bars were noted.
   iii) Shuttle Run. Students were timed over a distance of fifty yards which was composed of five times a ten yards distance in the gymnasium.

   A "physical fitness index" was calculated from the practical tests which it was thought indicated whether students would be able to cope with the practical work that constituted a large part of the three-year course.

Colleges' Assessments Variables.

6. The Education department awarded students marks for their performance during the three years of the study of Education. These were available as literal grades.
7. Teaching marks were awarded to students predominantly for their teaching ability in physical education situations.
8. There were no marks for ability in English.
9. Students attended a two-year course in subjects other than their main course. Literal grades on a five-point scale were awarded to students.
10. A final main subject mark was given. This was an average of marks for examinations in theory of physical education, anatomy and physiology and practical physical activity. It was obtained as a literal grade on a five-point scale.

11-35 were not measured at this college.

ACADEMIC STUDENTS. (n = 147, 50% Random Sample).

Pre-College Entrance Variables.

1. The headmasters' assessments of students' potential as teachers were available as literal grades from A down to E.
2. The number of G.C.E. 'A' level examination passes that the students had obtained by the time they entered college were noted.
3. "Academic potential" was measured subjectively during a discussion with a senior member of staff of the main subject department of the students' choice. Literal grades were awarded on a five-point scale.
4. Personality was measured subjectively during a discussion with a senior member of the Education staff. It was obtained on a five-point scale from A down to E.
5. No practical physical education test was given to academic students.

Colleges' Assessments Variables.

6. The Education department awarded students marks for their performances during the three years of the study of Education. These were available as literal grades.
7. Teaching marks were awarded on the basis of students' teaching ability in classroom situations in academic subjects.
8. There was no mark available for English.
9. Marks were awarded to students for their performances during a two-year course in a second or "subsidiary" subject.
10. Literal grades were available for students' performances in their main academic subject course.

11-35 were not measured in this college.

Summary of the grades awarded to students at College V

(a) Physical Education Students (n= 81).

GRADES.	VARIABLES. 1. HEA-DMA.	2. GCA-LEV.	3. INA-CAD.	4. INP-ERS.	5. INP-RAC.	6. EDU-CMK.	7. TCH-GMK.	8. ENG-MAK.	9. SUB-SID.	10. MAI-NMK.	11. PET-HEO.	12. PED-ISS.	13. PEP-RAC.
A.	14.8	3.7	0	1.2	3.7	1.2	5.0	-	1.2	2.5			
B.	40.7	17.3	14.8	24.7	21.0	14.8	39.5	-	16.0	28.4			
C.	43.3	27.2	75.3	69.2	64.2	66.7	48.1	-	60.5	51.9			
D.	1.2	51.8	9.9	4.9	9.9	17.3	7.4	-	22.3	17.2			
E.	0	0	0	0	1.2	0	0	-	0	0			
MEANS	3.60	3.22	2.97	3.15	3.18	3.27	3.39	-	3.21	3.09			
S.D.	0.74	1.02	0.60	0.54	0.61	0.67	0.73	-	0.78	0.76			

(b) Academic Students (n =147).

GRADES.	VARIABLES. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.			
A.	9.5	12.2	0	1.4	-	3.4	5.4	-	4.8	2.7			
B.	44.9	27.2	15.6	18.4	-	27.2	37.4	-	26.5	25.9			
C.	42.2	32.7	65.3	74.1	-	61.2	48.3	-	53.1	50.3			
D.	2.0	26.5	19.1	6.1	-	8.2	8.9	-	15.6	21.1			
E.	1.4	1.4	0	0	-	0	0	-	0	0			
MEANS	3.69	2.73	3.05	3.22	-	3.00	3.42	-	2.96	3.17			
S.D.	0.74	0.88	0.50	0.55	-	0.61	0.70	-	0.66	0.73			
't' with P.E.	0.88 n.s.	3.65 1%	1.02 n.s.	0.94 n.s.		3.02 1%	0.30 n.s.		2.45 5%	0.77 n.s.			

APPENDIX B(VI).

Details of the visit and data collected from

COLLEGE VI.

PHYSICAL EDUCATION STUDENTS. (n = 191, total population)

Pre-College Entrance Variables.

1. The headmasters' assessment of the students' potential as teachers was recorded as literal grades on a five-point scale from A down to E.
2. The number of G.C.E. 'A' level examination passes obtained by the students prior to their arrival at the college were noted.
3. No grade was awarded at this college for academic ability, for students were only selected for interview if they had "at least a chance of passing two 'A' levels".
4. The "personality" test consisted of an interview of approximately fifteen minutes duration with the head of physical education department. Additionally a reading and written essay test were given, then grades on a five-point scale were awarded to the students.
5. The practical gymnasium tests were given to all students and aimed to measure the students' physical skill potential and motor ability:
   i) Agility Run. A zig-zag run around obstacles in the gymnasium. The performances were timed.
   ii) Standing Long Jump. The distance was measured of students' attempts to propel themselves forward as far as possible from a standing position.
   iii) Alternate Hand Wall Toss. The number of times were counted in one minute of students' successful throwing of a tennis ball against a wall using left and right hand alternately.
   iv) Sitting Basketball Throw. The distance was measured of students' best distance thrown of a basketball from a sitting down position.

   Using norms developed from scores obtained over the years at this college, percentage marks were available for students' scores on these tests.

Colleges' Assessments Variables.

6. The Education department awarded students marks for their performances during the three years of the study of Education. These were available as percentages and literal grades.
7. A teaching mark was awarded to the students by members of the physical education staff, based on the students' performance in the teaching of physical education.
8. There was no English course for final assessment.
9. Students attended a two-year second subject or "subsidiary" course. Marks were available in both literal grades and percentages.
10. Final main subject marks were available in percentages and literal grades for the students' performances in the various physical education examinations.

11-35 were not measured at this college.

ACADEMIC STUDENTS. It was not possible to study the records of the academic students at this college.

Summary of the grades awarded to students at College VI.

(a) Physical Education Students (n= 191).

GRADES.	VARIABLES. 1. HEA-DMA.	2. GCA-LEV.	3. INA-CAD.	4. INP-ERS.	5. INP-RAC.	6. EDU-CMK.	7. TCH-GMK.	8. ENG-MAK.	9. SUB-SID.	10. MAI-NMK.	11. PET-HEO.	12. PED-ISS.	13. PEP-RAC.
A.	28.8	-	-	4.7	11.5	3.7	5.8	-	5.2	9.4			
B.	53.9	-	-	71.2	19.9	21.5	35.1	-	26.1	20.4			
C.	15.6	-	-	23.6	39.8	59.2	47.1	-	55.1	59.2			
D.	1.7	-	-	0.5	20.4	13.5	11.5	-	9.4	7.9			
E.	0	-	-	0	8.4	2.1	0.5	-	4.2	3.1			
MEANS	4.11	-	-	3.78	3.06	3.11	3.32	-	3.19	3.24			
S.D.	0.70	-	-	0.53	1.10	0.77	0.79	-	0.85	0.86			

(b) Academic Students (n = 0).

GRADES.	VARIABLES. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.			
A.													
B.													
C.													
D.													
E.													

APPENDIX B(VII).

Details of the visit and data collected from

COLLEGE VII.

PHYSICAL EDUCATION STUDENTS. (n = 79, total population of two years).

Pre-College Entrance Variables.

1.
2. Records were not available for this information to be collected.
3.
4.

5. Grades on a five-point scale A to E were awarded to students at their interviews which included practical tests in the gymnasium which were "designed to show potential as well as present performance". These tests consisted of arm and leg strength tests, endurance tests and skill ability tests, the scores from which were combined and using their own norms, aggregate scores were available for all students. The college staff were in the process of revising the tests and were reluctant to give details of the tests previously used.

Colleges' Assessments Variables.

6. The education department awarded grades on a five-point scale to students for their performances in Education examinations.
7. Teaching marks were awarded to students on a five-point scale from A to E by physical education staff.
8. No English course marks were available.
9. In this college, students of physical education were required to take two main subject courses. Under this "second subject" heading they studied the physiological and more scientific aspects of physical education. Marks for performances were available as literal grades.
10. The main subject literal grade was awarded to students for their performances in the theory of physical education and practical examinations.

11-35. were not available at this college.

ACADEMIC STUDENTS.

Records of the academic students were not available at this college.

Summary of the grades awarded to students at College VII.

(a) Physical Education Students (n= 79).

GRADES.	VARIABLES. 1. HEA-DMA.	2. GCA-LEV.	3. INA-CAD.	4. INP-ERS.	5. INP-RAC.	6. EDU-CMK.	7. TCH-GMK.	8. ENG-MAK.	9. SUB-SID.	10. MAI-NMK.	11. PET-HEO.	12. PED-ISS.	13. PEP-RAC.
A.					3.8	1.3	3.8	-	5.1	6.3			
B.					21.5	32.9	46.2	-	29.1	32.9			
C.					59.5	62.0	46.2	-	54.4	57.0			
D.					15.2	3.8	3.8	-	10.1	3.8			
E.					0	0	0	-	1.3	0			
MEANS					3.14	3.83	3.50	-	3.27	3.42			
S.D.					0.71	0.65	0.74	-	0.76	0.67			

(b) Academic Students (n = 0).

GRADES.	VARIABLES. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.			
A.													
B.													
C.													
D.													
E.													

APPENDIX B (VIII).

Details of the visit and data collected from

COLLEGE VIII.

PHYSICAL EDUCATION STUDENTS. (n = 65, total population of two years).

Pre-College Entrance Variables.

1. Headmasters' assessments of the students' potential as teachers were available in the form of literal grades on a five point scale from A down to E.
2.)
3.) These were not available at this college.
4. The interview procedures included discussions with the vice-principal and/or the second subject head of department during which the students' "personality" was subjectively graded on a five-point scale.
5. Practical tests were given to students in the gymnasium during their interviews but the physical education staff asserted that the importance of these should not be overestimated, "we have no set criteria but like candidates to have at least one 'A' level and to convince us that they are genuinely interested in our subject". Marks nevertheless were awarded for performance on a five-point literal scale:
   i) Fitness Test.)
   ii) Ball Skills Test.) Full details were not available.

Colleges' Assessments Variables.

6. The marks obtained by students in their Education three-year course were not available in literal grades, but simply in "distinction", "pass" and "fail" classifications.
7. The teaching marks were obtained for the physical education students in "distinction", "pass" and "fail" classifications.
8.)
9.) These were not obtained.
10. Overall literal grades for physical education students performance in their final main subject examinations were not available. Results were obtained in a "distinction", "pass" and "fail" classifications.

11-35. Were not measured at this college.

ACADEMIC STUDENTS. No information was collected on academic students.

Summary of the grades awarded to students at College VIII.

...

(a) Physical Education Students (n= 65).

GRADES.	VARIABLES. 1. HEA-DMA.	2. GCA-LEV.	3. INA-CAD.	4. INP-ERS.	5. INP-RAC.	6. EDU-CMK.	7. TCH-GMK.	8. ENG-MAK.	9. SUB-SID.	10. MAI-NMK.	11. PET-HEO.	12. PED-ISS.	13. PEP-RAC.
A.	21.5	-	-	1.5	1.5	0	4.6	-	-	0			
B.	44.6	-	-	26.2	35.4			-	-	37.7			
C.	27.7	-	-	70.8	63.1	100	95.4	-	-	62.3			
D.	6.2	-	-	1.5	0			-	-				
E.	0	-	-	0	0	0	0		-	0			
MEANS	3.81	-	-	3.28	3.38								
S.D.	0.85	-	-	0.52	0.52								

(b) Academic Students (n = 0).

GRADES.	VARIABLES. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.			
A.													
B.													
C.													
D.													
E.													

APPENDIX B(IX).

Details of the visit and data collected from

COLLEGE IX.

PHYSICAL EDUCATION STUDENTS. (n = 98, total population).

Pre-College Entrance Variables.

1.)
2.)
3.) These were not available at this college.
4.)
5. The interviews were described thus: "we have no hard and fast rules in selection of students. Five 'O' levels is acceptable if a man has good personal qualities and will apply himself, but preferably one or more 'A' levels. We like a man to have one sport to a high level, and we also give a practical test as a guide".
   i) Strength.)
   ii) Mobility.)
   iii) Agility.) Full details were not readily available.
   iv) Vaulting.)

Colleges' Assessments Variables.

6. Literal grades on a five-point scale from A down to E were not available for students' performances in Education theory examinations. Results were collected in "distinction", "pass" and "fail" classifications.
7. Students' teaching marks were available in "distinction", "pass" and "fail" classifications.
8.)
9.) These were not obtained.
10. Final literal grades for students' overall performances in physical education were obtained.
11-35. Were not measured at this college.

ACADEMIC STUDENTS. No marks were obtained for these students.

Summary of the grades awarded to students at
College IX

(a) Physical Education Students (n= 98).

GRADES.	VARIABLES. 1. HEA-DMA.	2. GCA-LEV.	3. INA-CAD.	4. INP-ERS.	5. INP-RAC.	6. EDU-CMK.	7. TCH-GMK.	8. ENG-MAK.	9. SUB-SID.	10. MAI-NMK.	11. PET-HEO.	12. PED-ISS.	13. PEP-RAC.
A.					0	1.0	9.2	-	-	9.2			
B.					26.5			-	-	51.0			
C.					72.5	99.0	90.8	-	-	22.5			
D.					1.0			-	-	17.3			
E.					0	0	0	-	-	0			
MEANS					3.24					3.52			
S.D.					0.48					0.91			

(b) Academic Students (n = 0).

GRADES.	VARIABLES. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.			
A.													
B.													
C.													
D.													
E.													

APPENDIX B(X).

Details of the visit and data collected from

COLLEGE X.

PHYSICAL EDUCATION STUDENTS. (n = 117, total population).

Pre-College Entrance Variables.

1.)
2.)
3.) These were not collected.
4.)
5. The interview procedures included practical tests in the gymnasium.
   i) Dance Test.
   ii) Gymnastics Test.
   iii) Physical Fitness Index.
   iv) Mobility Test.
   v) Sargent Jump.
   vi) Chins.
   vii) Shuttle Run.
   viii) Standing Long Jump.
   ix) Hand Wall Toss.
   x) Sitting Basketball Throw.
   xi) General Dress and Turnout.

   An overall literal grade was given.

Colleges' Assessments Variables.

6. Students' performances in their Education theory course were not available as literal grades on a five-point scale, but simply as "distinction", "pass" and "fail" classifications.
7. Students' teaching of physical education ability-graded "distinction", "pass" or "fail".
8. No English course marks were available.
9. Students' performances in their second subject or "subsidiary" courses were available in classifications "distinction", "pass" or "fail".
10. Students' overall performances on the three-year physical education course were available in classifications "distinction", "pass" or "fail".

11-35 were not measured at this college.

ACADEMIC STUDENTS. No extracts of the records of these students were taken.

Summary of the grades awarded to students at
College X

(a) Physical Education Students (n= 117).

GRADES.	VARIABLES. 1. HEA-DMA.	2. GCA-LEV.	3. INA-CAD.	4. INP-ERS.	5. INP-RAC.	6. EDU-CMK.	7. TCH-GMK.	8. ENG-MAK.	9. SUB-SID.	10. MAI-NMK.	11. PET-HEO.	12. PED-ISS.	13. PEP-RAC.
A.					1.7	1.7	0	-	3.4	6.0			
B.					17.1			-					
C.					61.5	98.3	100	-	96.6	94.0			
D.					18.0			-					
E.					0.9	0	0	-	0	0			
MEANS					2.98								
S.D.					0.74								

(b) Academic Students (n = 0).

GRADES.	VARIABLES. 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.			
A.													
B.													
C.													
D.													
E.													

APPENDIX C.

Questionnaire sent to all candidates NOT offered places

after interview at College I in 1967, 1968 and 1969.

Author's home address.
Date.

Dear Sir,

I am carrying out an investigation into the careers of young people throughout the country. My purpose is to attempt to discover whether opportunities exist for those who qualify for higher education to receive that education if they so desire it.

I shall be pleased if you will kindly complete the following details and return the reply to me in the stamped addressed envelope which is enclosed.

PLEASE NOTE THAT YOU DO NOT HAVE TO SIGN THE REPLY. I assure you that your reply will not be published.

Yours Sincerely,

---

1. Details of your G.C.E. 'O' level examination results.

DATE TAKEN	SUBJECTS	GRADES OBTAINED

2. Details of your G.C.E. 'A' level examination results.

DATE TAKEN	SUBJECTS	GRADES OBTAINED

3. Brief details of other examinations taken.

4. Details of Further/Higher Education since leaving secondary school.

COLLEGE/UNIVERSITY	DATES ATTENDED	NAMES OF COURSES	QUALIFICATIONS OBTAINED (INCL. GRADES/CLASSIFICATIONS).

5. Details of your full-time occupation since leaving secondary school.

NATURE OF OCCUPATION/ PROFESSION	TITLE OR POSITION HELD BY YOU	DATES	DID YOU INTEND THIS TO BE A PERMANENT OCCUPATION?

6. Please add any further information that you consider relevant, (e.g. whether you have had to abandon your original career plans owing to unsuccessful examination results or interviews).

APPENDIX D.

Statistical formulae used in the treatment of the various data contained in this present research.

1. MEAN $(\bar{X})$

$$\bar{X} = \frac{\Sigma X}{n}$$

where Σ = Sum.
X = Each of the Raw Scores.
n = Number of Scores.

2. STANDARD DEVIATION (s)

$$s = \sqrt{\frac{\Sigma x^2}{n - 1}}$$

where x = deviation from the mean of the sample.
n = number of cases in the sample.

3. PEARSON PRODUCT - MOMENT CORRELATION (r)

$$r_{xy} = \frac{\Sigma xy}{\sqrt{(\Sigma x^2)(\Sigma y^2)}}$$

where x = deviation of each X score from the mean in that test.
y = deviation of each Y score from the mean in the second test.

4. REGRESSION

(i) $$b = \frac{\Sigma xy}{\Sigma x^2}$$

where b = regression coefficient of Y on X.

(ii) $$a = \bar{Y} - b\bar{X}$$

where a = the intercept of the regression line.
$\bar{Y}$ = mean of the Y values in the sample.
$\bar{X}$ = mean of the X values in the sample.

(iii) $$\tilde{Y} = a + bX$$

where $\tilde{Y}$ = predicted value of Y.

5. STANDARD ERROR OF THE ESTIMATE ($s_{y.x}$)

$$s_{y.x} = \sqrt{\frac{\Sigma y^2 - \frac{(\Sigma xy)^2}{\Sigma x^2}}{n - 2}}$$

6. MULTIPLE CORRELATION (R)

$$Ry.x1x2 = \sqrt{\frac{r^2yx1 - r^2yx2 - 2ryx1.ryx2.rx1x2}{1 - r^2x1x2}}$$

7. CHI SQUARE (χ^2)

(i) $$\chi^2 = \Sigma \frac{(\text{Observed frequencies} - \text{Expected frequencies})^2}{\text{Expected frequencies}}$$

(ii) With Yates's Correction

$$\chi^2 = \frac{[(O\,f - E\,f) - 0.5]^2}{E\,f}$$

8. HOMOGENEITY OF VARIANCE

$$F = \frac{\text{largest } s^2}{\text{smallest } s^2}$$

9. ANALYSIS OF VARIANCE

(i) Total sums of squares (Total S.S.) = $X^2 - \frac{(X)^2}{n}$

(ii) Within sums of squares (Within S.S.) = $X^2 - \frac{(X)^2}{n}$

(iii) Between sums of squares (Between S.S.) = Total sums of squares less within sums of squares.

(iv) Degrees of freedom
Total degrees of freedom = number of subjects minus one $(n - 1)$
Between groups degrees of freedom = number of groups minus one $(k - 1)$
Within groups degrees of freedom = $(n - k)$

(v) Mean Squares
Between groups mean square = $\frac{\text{Between S.S.}}{\text{Between d. of f.}}$
Within groups mean square = $\frac{\text{Within S.S.}}{\text{Within d. of f.}}$

(vi) $F = \frac{\text{Between groups mean square}}{\text{Within groups mean square}}$

10. PERSONALITY SCORING.

(i) Raw scores were obtained by use of the stencil key provided with the sixteen personality factor questionnaire.

(ii) The raw scores were converted to stens by reference to the British norms published by Saville P. (1972)

(iii) To obtain the second-order factor scores, stens (not raw scores) were converted as per formulae in Cattell & Eber (1964, page 19):

FACTOR I. CONSTANT 38 + 2(STEN L) + 3(STEN O) + 4(STEN Q4) - 2(STEN C) - 2(STEN H) - 2(STEN Q3), RESULTANT DIVIDED BY 10.

FACTOR II. 2(STEN A) + 3(STEN E) + 4(STEN F) + 5(STEN H) - 2(STEN Q2) - CONSTANT 11, RESULTANT DIVIDED BY 10.

FACTOR III. CONSTANT 77 + 2(STEN C) + 2(STEN E) + 2(STEN F) + 2(STEN N) - 4(STEN A) - 6(STEN I) - 2(STEN M), RESULTANT DIVIDED BY 10.

11. STATISTICAL TEXTS.

The main texts used for formulae, statistical procedures and tables were:

CATTELL R.B. & EBER H.W. (1964 & 1970).
GUILFORD J.P. (1965).
POPHAM W.J. (1967).
SAVILLE P. (1972).
WERT J.E. (1954).

APPENDIX E (1).

Computer programme designed to print out Pearson product-moment correlations, regression equations and standard error of the estimate.

```
10 DIM X(13,200),A(13),B(13),C(13,13)
20 PRINT "TYPE NUMBER OF VARIABLES IN FIRST BLOCK,THE TOTAL"
30 PRINT "NUMBER OF VARIABLES AND THE NUMBER OF DATA ITEMS"
40 PRINT"IN EACH VARIABLE"
50 INPUT L,M,N
60 FOR I = 1 TO M
70 FOR J = 1 TO N
80 READ X(I,J)
90 NEXT J
100 NEXT I
110 REM CALCULATIONS OF SUMMATIONS
120 FOR K = 1 TO M
130 LET A(K) = 0
140 LET B(K) = 0
150 FOR T = 1 TO N
160 LET A(K) = A(K) + X(K,T)
170 LET B(K) = B(K) + X(K,T)↑2
180 NEXT T
190 FOR U = K TO M
200 LET C(K,U) = 0
210 FOR S = 1 TO N
220 LET C(K,U) = C(K,U) + X(K,S)*X(U,S)
230 NEXT S
240 NEXT U
250 NEXT K
```

```
260 PRINT "CORRELATION BETWEEN ROWS IS AS FOLLOWS"
270 PRINT "ROW";"ROW";"COEFFICIENT OF CORRELATION"
280 FOR P = 1 TO M-1
290 FOR Q = P TO M
300 LET D = ((B(P)-A(P)↑2/N)*(B(Q)-A(Q)↑2/N))↑(1/2)
310 LET W = C(P,Q)-A(P)*A(Q)/N
320 PRINT P;Q;W/D
330 NEXT Q
340 NEXT P
350 PRINT "NEXT SECTION IS REGRESSION OF VARIABLES FROM"
360 PRINT"SECOND BLOCK ON THOSE FROM FIRST BLOCK"
370 PRINT "LINE OF REGRESSION,Y = A + BX IS AS FOLLOWS:"
380 PRINT "ROW";"ON ROW";"Y = A + BX","STANDARD ERROR"
390 FOR Y = 1 TO L
400 FOR Z = L+1 TO M
410 LET E = (B(Y)*A(Z)-A(Y)*C(Y,Z))/(N*B(Y)-A(Y)↑2)
420 LET F = (N*C(Y,Z)-A(Y)*A(Z))/(N*B(Y)-A(Y)↑2)
430 LET G = B(Z)-A(Z)↑2/N
440 LET H = (C(Y,Z)-A(Z)*A(Y)/N)↑2/(B(Y)-A(Y)↑2/N)
450 LET S = SQR((G-H)/(N-2))
460 PRINT Z;Y;"Y=";E;"+";F;"X",S
470 NEXT Z
480 NEXT Y
900 END
```

APPENDIX E (2).

Computer programme designed to print out Pearson product-moment correlations for up to thirty-two variables.

```
NEW NW
10 DIM X (32,94), A(32), B(32), C(32,32)
20 PRINT "NUMBER OF VARIABLES"
30 PRINT "NUMBER OF DATA ITEMS"
40 INPUT M,N
50 FOR I = 1 TO M
60 FOR J = 1 TO N
7
70 READ X(I,J)
770
70 READ X(I,J)
80 NEXT J
90 NEXT I
100 REM CALCULATIONS OF SUMMATIONS
110 FOR K = 1 TO M
120 LET A(K) = 0
130 LET B(K) = 0
140 FOR T = 1 TO N
150 LET A(K) = A(K) + X(K,T)
160 LET B(K) = B(K) + X(K,T)↑2
170 NEXT T
```

```
180 FOR U = K TO M
190 LET C(K,U) = 0
200FOR S = 1 TO N
210 LET C(K,U) = C(K,U) + X(K,S) * X(U,S)
220 NEXT S
30
? 220 NEXT S2/
220 NEXT S
230 NEXT U
240 NEXT K
250 PRINT "CORRELATION BETWEEN ROWS IS AS FOLLOWS"
260 PRINT "ROW";"ROW";"CORRELATION COEFFICIENT"
270 FOR P = 1 TO M = 1
? 270 FOR P = 1 TO M/
270 FOR P = 1 TO M=1
? 270 FOR P = 1 TO M/
270 FOR P = 1 TO M-1
280 FOR Q = P TO M
290 LET D = ((B(P) - A(P)↑2/N) * (B(Q)-A(Q)↑2/N))↑(1/2)
300 LET W = C(P,Q) -A(P)*A(Q)/N
310 PRINT P;Q; W/D
320 NEXT Q
330 NEXT P
900 END
```

APPENDIX F (IA).

Computer print-out of relationships between the physical education student variables at College I.

(Throughout the Appendices, the ROW numbers represent the computer numbering of the columns of data, these have been converted to VARIABLE numbers in Chapter Four).

```
                    RUN PROCEEDING
 TYPE NUMBER OF VARIABLES IN FIRST BLOCK,THE TOTAL
 NUMBER OF VARIABLES AND THE NUMBER OF DATA ITEMS
 IN EACH VARIABLE
 - 5,13,138
 CORRELATION BETWEEN ROWS IS AS FOLLOWS
 ROWROWCOEFFICIENT OF CORRELATION
  1   1   1
  1   2    .191263
  1   3    .333783
  1   4    .230512
  1   5    .529023E-1
  1   6    .953848E-1
  1   7   -.648835E-1
  1   8   -.308544E-1
  1   9   -.435619E-2
  1  10     -.256644E-1
  1  11      .780695E-1
  1  12     -.140993
  1  13     -.131408E-1
  2   2   1
  2   3    .578785
  2   4    .204215
  2   5   -.698973E-1
  2   6    .339426
  2   7    .384223E-1
  2   8    .222197
  2   9    .24591
  2  10      .224607
  2  11      .24553
  2  12     -.648007E-1
  2  13     -.128816
  3   3   1
  3   4    .191408
  3   5   -.15725
  3   6    .181316
  3   7   -.583926E-1
  3   8    .157701
  3   9    .202239
  3  10      .115747
  3  11      .18323
  3  12     -.88267E-1
  3  13     -.15607
  4   4   1
  4   5    .848067E-1
  4   6    .10041
  4   7    .20124E-1
  4   8    .160762
  4   9    .302252E-1
  4  10      .499155E-1
  4  11      .244176E-1
  4  12     -.105467
  4  13     -.648197E-1
```

```
5  5  1
5  6 -.423989E-1
5  7  .174041
5  8 -.112436
5  9 -.104459
5  10   -.1486E-1
5  11   -.875211E-1
5  12    .355039E-1
5  13    .423913E-1
6  6  1
6  7  .281814
6  8  .330597
6  9  .230221
6  10    .170482
6  11    .433479
6  12   -.102414
6  13   -.16471
7  7  1
7  8  .114855
7  9  .157739
7  10    .11348
7  11    .215628
7  12   -.696215E-1
7  13   -.127317E-1
8  8  1
8  9  .223494E-1
8  10    .21809
8  11    .899327E-1
8  12   -.191499
8  13   -.162305
9  9  1.
9  10   -.15361E-1
9  11    .188429
9  12   -.638042E-1
9  13   -.257922E-1
10   10   1
10   11    .264369
10   12   -.433731E-1
10   13   -.911446E-1
11   11    1
11   12   -.858674E-2
11   13   -.424837E-1
12   12    1
12   13    .57909
```

```
NEXT SECTION IS REGRESSION OF VARIABLES FROM
SECOND BLOCK ON THOSE FROM FIRST BLOCK
LINE OF REGRESSION,Y = A + BX IS AS FOLLOWS:
ROWON ROWY = A + BX                    STANDARD ERROR
 6   1 Y= 3.27395 + .85189E-1   X                    .570337
 7   1 Y= 3.76204 +-.706888E-1  X                    .697449
 8   1 Y= 3.39487 +-.279648E-1  X                    .581166
 9   1 Y= 3.16572 +-.517866E-2  X                    .762638
 10    1 Y= 3.86173 +-.269291E-1  X                  .672914
 11    1 Y= 3.27395 + .85189E-1   X                  .697889
 12    1 Y= 4.4275  +-.122734 X                      .552866
 13    1 Y= 3.94744 +-.139824E-1  X                  .682548
 6   2 Y= 2.94755 + .199217 X    .538935
 7   2 Y= 3.38597 + .275091E-1  X                    .698405
 8   2 Y= 2.83858 + .132346 X    .566908
 9   2 Y= 2.50036 + .192116 X    .739227
 10    2 Y= 3.23399 + .154878 X                      .655937
 11    2 Y= 3.02522 + .176069 X                      .678597
 12    2 Y= 4.05916 +-.370702E-1  X                  .557271
 13    2 Y= 4.19351 +-.900755E-1  X                  .67692
 6   3 Y= 3.0618  + .172232 X    .563453
 7   3 Y= 3.69596 +-.676626E-1  X                    .697729
 8   3 Y= 2.7935  + .152021 X    .574167
 9   3 Y= 2.3222  + .255712 X    .746886
 10    3 Y= 3.33802 + .129174 X                      .668611
 11    3 Y= 2.93175 + .212654 X                      .688174
 12    3 Y= 4.19772 +-.817223E-1  X                  .556265
 13    3 Y= 4.45958 +-.176626 X                      .674243
 6   4 Y= 3.2453  + .105461 X    .570054
 7   4 Y= 3.38765 + .257833E-1  X                    .69878
 8   4 Y= 2.68039 + .171352 X    .57388
 9   4 Y= 2.99642 + .42256E-1   X                    .762297
 10    4 Y= 3.53715 + .615936E-1  X                  .672297
 11    4 Y= 3.50582 + .313339E-1  X                  .699817
 12    4 Y= 4.31423 +-.107968 X                      .55533
 13    4 Y= 4.17637 +-.811101E-1  X                  .681172
 6   5 Y= 3.76347 +-.407186E-1  X                    .572435
 7   5 Y= 2.73952 + .203892 X    .688255
 8   5 Y= 3.67964 +-.109581 X    .577756
 9   5 Y= 3.62874 +-.133533 X    .758473
 10    5 Y= 3.81437 +-.167665E-1  X                  .673061
 11    5 Y= 3.98802 +-.102695 X                      .69734
 12    5 Y= 3.81437 + .332335E-1  X                  .558093
 13    5 Y= 3.71557 + .48503E-1   X                  .681994

                    FINISHED
```

APPENDIX F (IB).

Inter Correlations among two predictor and one criterion variables scores for 138 physical education students at College I, and Multiple Correlation Coefficient between those three scores considered simultaneously.

	RELATIONSHIP					COEFFICIENTS
(a)	EDUCMK	versus	HEADMA			r = 0.10
	EDUCMK	versus	GCALEV			r = 0.34
	HEADMA	versus	GCALEV			r = 0.19
	EDUCMK	versus	HEADMA	&	GCALEV	R = 0.34
(b)	EDUCMK	versus	GCALEV			r = 0.34
	EDUCMK	versus	INACAD			r = 0.18
	GCALEV	versus	INACAD			r = 0.58
	EDUCMK	versus	GCALEV	&	INACAD	R = 0.34
(c)	EDUCMK	versus	GCALEV			r = 0.34
	EDUCMK	versus	INPRAC			r = -0.04
	GCALEV	versus	INPRAC			r = -0.07
	EDUCMK	versus	GCALEV	&	INPRAC	R = 0.43
(d)	EDUCMK	versus	INACAD			r = 0.18
	EDUCMK	versus	INPRAC			r = -0.04
	INACAD	versus	INPRAC			r = -0.16
	EDUCMK	versus	INACAD	&	INPRAC	R = 0.18
(e)	TCHGMK	versus	GCALEV			r = 0.04
	TCHGMK	versus	INPRAC			r = 0.17
	GCALEV	versus	INPRAC			r = -0.07
	TCHGMK	versus	GCALEV	&	INPRAC	R = 0.17
(f)	TCHGMK	versus	INACAD			r = -0.06
	TCHGMK	versus	INPRAC			r = 0.17
	INACAD	versus	INPRAC			r = -0.16
	TCHGMK	versus	INACAD	&	INPRAC	R = 0.17
(g)	TCHGMK	versus	INPERS			r = 0.02
	TCHGMK	versus	INPRAC			r = 0.17
	INPERS	versus	INPRAC			r = -0.16
	TCHGMK	versus	INPERS	&	INPRAC	R = 0.17
(i)	ENGMAK	versus	GCALEV			r = 0.22
	ENGMAK	versus	INACAD			r = 0.16
	GCALEV	versus	INACAD			r = 0.58
	ENGMAK	versus	GCALEV	&	INACAD	R = 0.22
(j)	SUBSID	versus	GCALEV			r = 0.25
	SUBSID	versus	INACAD			r = 0.16
	GCALEV	versus	INACAD			r = 0.58
	SUBSID	versus	GCALEV	&	INACAD	R = 0.25

	RELATIONSHIP					COEFFICIENTS
(k)	SUBSID	versus	INACAD			r = 0.20
	SUBSID	versus	INPERS			r = 0.03
	INACAD	versus	INPERS			r = 0.20
	SUBSID	versus	INACAD	&	INPERS	R = 0.20
(l)	MAINMK	versus	INACAD			r = -0.16
	MAINMK	versus	INPRAC			r = 0.04
	INACAD	versus	INPRAC			r = -0.16
	MAINMK	versus	INACAD	&	INPRAC	R = 0.16
(m)	PETHEO	versus	GCALEV			r = 0.25
	PETHEO	versus	INPRAC			r = -0.09
	GCALEV	versus	INPRAC			r = -0.07
	PETHEO	versus	GCALEV	&	INPRAC	R = 0.26
(n)	PETHEO	versus	INACAD			r = 0.18
	PETHEO	versus	INPRAC			r = -0.09
	INACAD	versus	INPRAC			r = -0.16
	PETHEO	versus	INACAD	&	INPRAC	R = 0.19
(o)	PEDISS	versus	GCALEV			r = 0.22
	PEDISS	versus	INPERS			r = 0.05
	GCALEV	versus	INPERS			r = 0.20
	PEDISS	versus	GCALEV	&	INPERS	R = 0.22
(p)	PEPRAC	versus	HEADMA			r = -0.14
	PEPRAC	versus	INPRAC			r = 0.04
	HEADMA	versus	INPRAC			r = 0.05
	PEPRAC	versus	HEADMA	&	INPRAC	R = 0.14

APPENDIX F (IC).

Computer print-out of relationships between the academic student variables at College I.

```
            RUN PROCEEDING
TYPE NUMBER OF VARIABLES IN FIRST BLOCK,THE TOTAL
NUMBER OF VARIABLES AND THE NUMBER OF DATA ITEMS
IN EACH VARIABLE
- 4,9,165
CORRELATION BETWEEN ROWS IS AS FOLLOWS
ROW             ROW             COEFFICIENT OF CORRELATION
 1               1               1
 1               2              -.103593
 1               3               .905435E-1
 1               4               .2308
 1               5               .146462
 1               6               .199385E-1
 1               7               .929686E-1
 1               8              -.273034E-1
 1               9               .775284E-1
 2               2               1.
 2               3               .354938
 2               4              -.294871E-1
 2               5               .480326E-1
 2               6               .325102E-1
 2               7              -.306714E-1
 2               8              -.99937E-1
 2               9               .114475
 3               3               1
 3               4               .213401
 3               5               .452289E-2
 3               6               .279273E-2
 3               7               .800566E-2
 3               8              -.534544E-1
 3               9              -.33935E-1
 4               4               1
 4               5               .161857
 4               6               .115534E-1
 4               7               .188454
 4               8               .289474E-1
 4               9               .881441E-1
 5               5               1
 5               6               .129757
 5               7               .431266
 5               8               .330272
 5               9               .392086
 6               6               1
 6               7               .130805
 6               8               .185299
 6               9               .321925
 7               7               1
 7               8               .279163
 7               9               .199495
 8               8               1
 8               9               .319267
```

NEXT SECTION IS REGRESSION OF VARIABLES FROM
SECOND BLOCK ON THOSE FROM FIRST BLOCK
LINE OF REGRESSION, Y = A + BX IS AS FOLLOWS:

ROW	ON ROW	Y = A + BX	STANDARD ERROR
5	1	Y= 2.98786	+ .136071 X
6	1	Y= 3.28286	+ .185714E-1 X
7	1	Y= 3.03643	+ .917857E-1 X
8	1	Y= 3.32357	+-.317857E-1 X
9	1	Y= 3.12571	+ .971429E-1 X
5	2	Y= 3.38832	+ .301724E-1 X
6	2	Y= 3.2819	+ .204741E-1 X
7	2	Y= 3.44537	+-.204741E-1 X
8	2	Y= 3.47352	+-.786638E-1 X
9	2	Y= 3.15511	+ .969828E-1 X
5	3	Y= 3.47225	+ .588565E-2 X
6	3	Y= 3.33997	+ .36435E-2 X
7	3	Y= 3.34067	+ .110706E-1 X
8	3	Y= 3.48234	+-.871637E-1 X
9	3	Y= 3.67363	+-.595572E-1 X
5	4	Y= 2.80801	+ .198728 X
6	4	Y= 3.30264	+ .142216E-1 X
7	4	Y= 2.53081	+ .245883 X
8	4	Y= 3.05302	+ .445359E-1 X
9	4	Y= 2.98328	+ .145958 X

FINISHED

APPENDIX F (ID).

Inter correlations among two predictor and one criterion variable scores for 165 academic students at College I, and Multiple Correlation Coefficient between those three scores considered simultaneously.

	RELATIONSHIP					COEFFICIENTS
(a)	EDUCMK	versus	HEADMA			r = 0.15
	EDUCMK	versus	GCALEV			r = 0.05
	HEADMA	versus	GCALEV			r = -.10
	EDUCMK	versus	HEADMA	&	GCALEV	R = 0.16
(b)	EDUCMK	versus	GCALEV			r = 0.05
	EDUCMK	versus	INPERS			r = 0.16
	GCALEV	versus	INPERS			r = -0.03
	EDUCMK	versus	GCALEV	&	INPERS	R = 0.16
(c)	TCHGMK	versus	GCALEV			r = 0.03
	TCHGMK	versus	INPERS			r = 0.01
	GCALEV	versus	INPERS			r = -0.03
	TCHGMK	versus	GCALEV	&	INPERS	R = 0.03
(d)	ENGMAK	versus	HEADMA			r = 0.09
	ENGMAK	versus	INPERS			r = 0.19
	HEADMA	versus	INPERS			r = 0.23
	ENGMAK	versus	HEADMA	&	INPERS	R = 0.19

APPENDIX F (IIA).

Computer print-out of relationships between the physical education student variables at College II.

```
                RUN PROCEEDING
TYPE NUMBER OF VARIABLES IN FIRST BLOCK, THE TOTAL
NUMBER OF VARIABLES AND THE NUMBER OF DATA ITEMS
IN EACH VARIABLE
? 5,13,106

13.52.47 BROADCAST: DUMPING IN FIVE MINUTES
CORRELATION BETWEEN ROWS IS AS FOLLOWS
ROW          ROW          COEFFICIENT OF CORRELATION
 1            1            1
 1            2            .109415
 1            3            .154017
 1            4            .281786E-1
 1            5           -.962765E-1
 1            6            .124296
 1            7            .152267
 1            8           -.798246E-2
 1            9            .638774E-1
 1           10           -.882597E-2
 1           11            .147925
 1           12            .251449
 1           13            .144055
 2            2            1.
 2            3           -.640477E-2
 2            4            .978607E-1
 2            5            .138556E-1
 2            6            .981428
 2            7            .168355
 2            8            .277159
 2            9            .220356
 2           10            .849099E-1
 2           11            .228625
 2           12            .17746
 2           13            .168581
 3            3            1
 3            4            .168862
 3            5            .979941E-1
 3            6            .864803E-1
 3            7            .781047E-1
 3            8            .170038
 3            9            .757436E-1
 3           10            .208776E-1
 3           11            .227755E-1
 3           12            .510122E-1
 3           13            .430345E-1
 4            4            1
 4            5            .58522
 4            6           -.787653E-1
 4            7            .783694E-1
 4            8            .334303E-1
 4            9           -.445695E-2
 4           10           -.877132E-1
```

5	5	1
5	6	-.513962E-1
5	7	.137346E-1
5	8	-.10621
5	9	-.134457E-1
5	10	-.118357
5	11	-.234768
5	12	.122696
5	13	-.125122
6	6	1
6	7	.320114
6	8	.454891
6	9	.356943
6	10	.377625
6	11	.570787
6	12	.185101
6	13	.52778
7	7	1
7	8	.30436
7	9	.105519
7	10	.252788
7	11	.272687
7	12	.27307
7	13	.275437
8	8	1
8	9	.344585
8	10	.261018
8	11	.314279
8	12	.183382
8	13	.271853
9	9	1
9	10	.172911
9	11	.366289
9	12	.95963E-1
9	13	.256768
10	10	1
10	11	.326483
10	12	.16215
10	13	.642133
11	11	1
11	12	.350423
11	13	.71345
12	12	1
12	13	.416596

NEXT SECTION IS REGRESSION OF VARIABLES FROM
SECOND BLOCK ON THOSE FROM FIRST BLOCK
LINE OF REGRESSION, Y = A + BX IS AS FOLLOWS:

ROW	ON ROW	Y = A + BX	STANDARD ERROR
6	1	Y= 2.89568	+ .111511 X .565446
7	1	Y= 2.88939	+ .169964 X .656517
8	1	Y= 3.3777	+-.719424E-2 X .572467
9	1	Y= 3.16187	+ .683453E-1 X .678245
10	1	Y= 3.80126	+-.116906E-1 X .841341
11	1	Y= 3.09577	+ .182104 X .773372
12	1	Y= 3.16906	+ .215827 X .527698
13	1	Y= 3.29766	+ .164568 X .718088
6	2	Y= 2.66152	+ .210788 X .527017
7	2	Y= 3.21568	+ .10891 X .655838
8	2	Y= 2.85276	+ .154275 X .550058
9	2	Y= 2.96553	+ .145614 X .662927
10	2	Y= 3.53126	+ .694623E-1 X .838335
11	2	Y= 3.26156	+ .173827 X .761264
12	2	Y= 3.72567	+ .940743E-1 X .536562
13	2	Y= 3.57019	+ .118943 X .715272
6	3	Y= 3.12205	+ .66273E-1 X .56773
7	3	Y= 3.33661	+ .698819E-1 X .663302
8	3	Y= 2.91929	+ .130906 X .564149
9	3	Y= 3.20669	+ .692257E-1 X .677681
10	3	Y= 3.67717	+ .23622E-1 X .84119
11	3	Y= 3.74213	+ .239501E-1 X .781772
12	3	Y= 3.90551	+ .374016E-1 X .544506
13	3	Y= 3.81496	+ .419948E-1 X .724985
6	4	Y= 3.58579	+-.681296E-1 X .568194
7	4	Y= 3.3093	+ .710554E-1 X .663686
8	4	Y= 3.2441	+ .290491E-1 X .572165
9	4	Y= 3.45057	+-.45977E-2 X .679626
10	4	Y= 4.15946	+-.112017 X .838131
11	4	Y= 4.08882	+-.741902E-1 X .780445
12	4	Y= 3.37513	+ .180773 X .532049
13	4	Y= 3.78746	+ .45768E-1 X .72503
6	5	Y= 3.47345	+-.378272E-1 X .569112
7	5	Y= 3.52429	+ .118021E-1 X .665272
8	5	Y= 3.62687	+-.785293E-1 X .569247
9	5	Y= 3.47571	+-.118021E-1 X .679572
10	5	Y= 4.20971	+-.128612 X .83546
11	5	Y= 4.65956	+-.237101 X .760119
12	5	Y= 3.72265	+ .863973E-1 X .541097
13	5	Y= 4.36768	+-.117264 X .719955

FINISHED

APPENDIX F (IIB).

Inter-correlations among two predictor and one criterion variable scores for 106 physical education students at College II, and Multiple Correlation Coefficient between those three scores considered simultaneously.

	RELATIONSHIP					COEFFICIENTS
(a)	EDUCMK	versus	HEADMA			r = 0.12
	EDUCMK	versus	GCALEV			r = 0.38
	HEADMA	versus	GCALEV			r = 0.11
	EDUCMK	versus	HEADMA	&	GCALEV	R = 0.39
(b)	EDUCMK	versus	GCALEV			r = 0.38
	EDUCMK	versus	INACAD			r = 0.09
	GCALEV	versus	INACAD			r = -0.01
	EDUCMK	versus	GCALEV	&	INACAD	R = 0.39
(c)	EDUCMK	versus	GCALEV			r = 0.38
	EDUCMK	versus	INPERS			r = -0.08
	GCALEV	versus	INPERS			r = 0.10
	EDUCMK	versus	GCALEV	&	INPERS	R = 0.39
(d)	EDUCMK	versus	GCALEV			r = 0.38
	EDUCMK	versus	INPRAC			r = -0.05
	GCALEV	versus	INPRAC			r = 0.04
	EDUCMK	versus	GCALEV	&	INPRAC	R = 0.38
(e)	TCHGMK	versus	HEADMA			r = 0.16
	TCHGMK	versus	GCALEV			r = 0.17
	HEADMA	versus	GCALEV			r = 0.11
	TCHGMK	versus	HEADMA	&	GCALEV	R = 0.22
(f)	ENGMAK	versus	GCALEV			r = 0.28
	ENGMAK	versus	INACAD			r = 0.17
	GCALEV	versus	INACAD			r = -0.01
	ENGMAK	versus	GCALEV	&	INACAD	R = 0.32
(g)	ENGMAK	versus	GCALEV			r = 0.28
	ENGMAK	versus	INPERS			r = 0.10
	GCALEV	versus	INPERS			r = 0.10
	ENGMAK	versus	GCALEV	&	INPERS	R = 0.28
(h)	SUBSID	versus	HEADMA			r = 0.06
	SUBSID	versus	GCALEV			r = 0.22
	HEADMA	versus	GCALEV			r = 0.11
	SUBSID	versus	HEADMA	&	GCALEV	R = 0.22
(i)	SUBSID	versus	GCALEV			r = 0.22
	SUBSID	versus	INACAD			r = 0.08
	GCALEV	versus	INACAD			r = -0.01
	SUBSID	versus	GCALEV	&	INACAD	R = 0.23

	RELATIONSHIP					COEFFICIENTS
(j)	PETHEO	versus	GCALEV			r = 0.23
	PETHEO	versus	INACAD			r = 0.02
	GCALEV	versus	INACAD			r = -0.01
	PETHEO	versus	GCALEV	&	INACAD	R = 0.23
(k)	PETHEO	versus	INACAD			r = 0.02
	PETHEO	versus	INPRAC			r = -0.23
	INACAD	versus	INPRAC			r = 0.10
	PETHEO	versus	INACAD	&	INPRAC	R = 0.23
(l)	PEPRAC	versus	HEADMA			r = 0.25
	PEPRAC	versus	GCALEV			r = 0.18
	HEADMA	versus	GCALEV			r = 0.11
	PEPRAC	versus	HEADMA	&	GCALEV	R = 0.29
(m)	PEPRAC	versus	HEADMA			r = 0.25
	PEPRAC	versus	INPRAC			r = 0.12
	HEADMA	versus	INPRAC			r = -0.10
	PEPRAC	versus	HEADMA	&	GCALEV	R = 0.29

APPENDIX F (IIC).

Computer print-out of relationships between the academic student variables at College II.

RUN PROCEEDING

TYPE NUMBER OF VARIABLES IN FIRST BLOCK,THE TOTAL NUMBER OF VARIABLES AND THE NUMBER OF DATA ITEMS IN EACH VARIABLE

- 4,9,104

CORRELATION BETWEEN ROWS IS AS FOLLOWS

ROW	ROW	COEFFICIENT OF CORRELATION
1	1	1
1	2	.281647
1	3	.166673
1	4	.242065
1	5	.975442E-1
1	6	.217143
1	7	.190912
1	8	.189037
1	9	.140919
2	2	1.
2	3	.22246
2	4	.266956
2	5	.292274
2	6	-.291644E-1
2	7	.41703
2	8	.248828
2	9	.207823
3	3	1
3	4	.262325
3	5	.159682
3	6	.207932
3	7	.134732
3	8	.155602
3	9	.244471
4	4	1
4	5	.207825
4	6	.133343
4	7	.160832
4	8	.197284
4	9	.201849
5	5	1
5	6	.239624
5	7	.326925
5	8	.123274
5	9	.262613
6	6	1
6	7	.134743
6	8	.156117
6	9	.395703
7	7	1
7	8	.331054
7	9	.11941
8	8	1
8	9	.235014

NEXT SECTION IS REGRESSION OF VARIABLES FROM
SECOND BLOCK ON THOSE FROM FIRST BLOCK
LINE OF REGRESSION, Y = A + BX IS AS FOLLOWS:

ROW	ON ROW	Y = A + BX	STANDARD ERROR
5	1	Y= 3.09627	+ .780545E-1 X .598086
6	1	Y= 2.84205	+ .200067 X .675436
7	1	Y= 2.9898	+ .146248 X .564724
8	1	Y= 2.80829	+ .176166 X .687252
9	1	Y= 2.87214	+ .161959 X .854523
5	2	Y= 2.79167	+ .174074 X .574711
6	2	Y= 3.675	+-.02 X .691652
7	2	Y= 2.725	+ .237778 X .522891
8	2	Y= 2.88333	+ .172593 X .677858
9	2	Y= 2.875	+ .177778 X .844291
5	3	Y= 2.95908	+ .13042 X .59324
6	3	Y= 2.95333	+ .195542 X .676823
7	3	Y= 3.19659	+ .105346 X .57006
8	3	Y= 2.98694	+ .148006 X .691346
9	3	Y= 2.53352	+ .286784 X .836945
5	4	Y= 2.81734	+ .1729 X .58783
6	4	Y= 3.17958	+ .127733 X .685767
7	4	Y= 3.12069	+ .128094 X .567816
8	4	Y= 2.843	+ .191147 X .686116
9	4	Y= 2.68564	+ .241192 X .84537

FINISHED

APPENDIX F (IID).

Inter correlations among two predictor and one criterion variable scores for 104 academic students at College II, and Multiple Correlation Coefficient between those three scores considered simultaneously.

	RELATIONSHIP					COEFFICIENTS
(a)	EDUCMK	versus	GCALEV			r = 0.29
	EDUCMK	versus	INACAD			r = 0.16
	GCALEV	versus	INACAD			r = 0.22
	EDUCMK	versus	GCALEV	&	INACAD	R = 0.30
(b)	TCHGMK	versus	HEADMA			r = 0.22
	TCHGMK	versus	INACAD			r = 0.21
	HEADMA	versus	INACAD			r = 0.17
	TCHGMK	versus	HEADMA	&	INACAD	R = 0.28
(c)	TCHGMK	versus	HEADMA			r = 0.22
	TCHGMK	versus	INPERS			r = 0.13
	HEADMA	versus	INPERS			r = 0.24
	TCHGMK	versus	HEADMA	&	INPERS	R = 0.23
(d)	TCHGMK	versus	INACAD			r = 0.21
	TCHGMK	versus	INPERS			r = 0.13
	INACAD	versus	INPERS			r = 0.26
	TCHGMK	versus	INACAD	&	INPERS	R = 0.22
(e)	ENGMAK	versus	GCALEV			r = 0.42
	ENGMAK	versus	INACAD			r = 0.13
	GCALEV	versus	INACAD			r = 0.22
	ENGMAK	versus	GCALEV	&	INACAD	R = 0.42
(f)	SUBSID	versus	HEADMA			r = 0.19
	SUBSID	versus	INACAD			r = 0.16
	HEADMA	versus	INACAD			r = 0.17
	SUBSID	versus	HEADMA	&	INACAD	R = 0.23
(g)	SUBSID	versus	GCALEV			r = 0.25
	SUBSID	versus	INACAD			r = 0.16
	GCALEV	versus	INACAD			r = 0.22
	SUBSID	versus	GCALEV	&	INACAD	R = 0.27
(h)	SUBSID	versus	INACAD			r = 0.16
	SUBSID	versus	INPERS			r = 0.20
	INACAD	versus	INPERS			r = 0.26
	SUBSID	versus	INACAD	&	INPERS	R = 0.22
(i)	MAINMK	versus	GCALEV			r = 0.21
	MAINMK	versus	INACAD			r = 0.24
	GCALEV	versus	INACAD			r = 0.22
	MAINMK	versus	GCALEV	&	INACAD	R = 0.28
(j)	MAINMK	versus	INACAD			r = 0.24
	MAINMK	versus	INPERS			r = 0.20
	INACAD	versus	INPERS			r = 0.26
	MAINMK	versus	INACAD	&	INPERS	R = 0.27

APPENDIX F (IIIA).

Computer print-out of relationships between the physical education student variables at College III.

```
            RUN PROCEEDING
TYPE NUMBER OF VARIABLES IN FIRST BLOCK,THE TOTAL
NUMBER OF VARIABLES AND THE NUMBER OF DATA ITEMS
IN EACH VARIABLE
? 4,7,158
CORRELATION BETWEEN ROWS IS AS FOLLOWS
ROW          ROW          COEFFICIENT OF CORRELATION
 1            1            1
 1            2            .184687
 1            3            .133076
 1            4            .673677E-1
 1            5            .719993E-1
 1            6            .116608
 1            7            .567526E-1
 2            2            1
 2            3           -.132259E-1
 2            4           -.948515E-1
 2            5            .319548
 2            6            .926951E-1
 2            7            .209544
 3            3            1
 3            4            .180128
 3            5            .980559E-1
 3            6            .19461
 3            7            .948931E-1
 4            4            1
 4            5            .251855E-1
 4            6            .161397
 4            7            .357566E-1
 5            5            1
 5            6            .256766
 5            7            .251691
 6            6            1
 6            7            .535232
NEXT SECTION IS REGRESSION OF VARIABLES FROM
SECOND BLOCK ON THESE FROM FIRST BLOCK
LINE OF REGRESSION,Y = A + BX IS AS FOLLOWS:
ROW          ON ROW       Y = A + BX                STANDARD ERROR
 5            1           Y= 2.57091    + .722709E-1 X   .733437
 6            1           Y= 3.00816    + .111733 X      .697164
 7            1           Y= 3.35289    + .515573E-1 X   .664447
 5            2           Y= 2.14073    + .253433 X      .696792
 6            2           Y= 3.24083    + .701779E-1 X   .698931
 7            2           Y= 3.13082    + .150408 X      .650744
 5            3           Y= 2.43291    + .10897  X      .731802
 6            3           Y= 2.65011    + .206449 X      .688532
 7            3           Y= 3.18699    + .954411E-1 X   .662516
 5            4           Y= 2.75633    + .236148E-1 X   .735113
 6            4           Y= 2.87533    + .144459 X      .69275
 7            4           Y= 3.43272    + .30343E-1  X   .665094

            FINISHED
```

APPENDIX F (III^{B}).

Inter-correlations among two predictor and one criterion variable scores for 158 physical education students at College III, and Multiple Correlation Coefficient between those three scores considered simultaneously.

	RELATIONSHIP					COEFFICIENTS
(a)	EDUCMK	versus	HEADMA			r = 0.07
	EDUCMK	versus	GCALEV			r = 0.32
	HEADMA	versus	GCALEV			r = 0.18
	EDUCMK	versus	HEADMA	&	GCALEV	R = 0.32
(b)	EDUCMK	versus	GCALEV			r = 0.32
	EDUCMK	versus	INPERS			r = 0.10
	GCALEV	versus	INPERS			r = -0.01
	EDUCMK	versus	GCALEV	&	INPERS	R = 0.33
(c)	EDUCMK	versus	GCALEV			r = 0.32
	EDUCMK	versus	INPRAC			r = 0.03
	GCALEV	versus	INPRAC			r = -0.09
	EDUCMK	versus	GCALEV	&	INPRAC	R = 0.32
(d)	TCHGMK	versus	GCALEV			r = 0.09
	TCHGMK	versus	INPERS			r = 0.19
	GCALEV	versus	INPERS			r = -0.01
	TCHGMK	versus	GCALEV	&	INPERS	R = 0.21
(e)	TCHGMK	versus	INPERS			r = 0.19
	TCHGMK	versus	INPRAC			r = 0.16
	INPERS	versus	INPRAC			r = 0.18
	TCHGMK	versus	INPERS	&	INPRAC	R = 0.22
(f)	MAINMK	versus	GCALEV			r = 0.21
	MAINMK	versus	INPERS			r = 0.09
	GCALEV	versus	INPERS			r = -0.01
	MAINMK	versus	GCALEV	&	INPERS	R = 0.22
(g)	MAINMK	versus	GCALEV			r = 0.21
	MAINMK	versus	INPRAC			r = 0.04
	GCALEV	versus	INPRAC			r = -0.09
	MAINMK	versus	GCALEV	&	INPRAC	R = 0.21

APPENDIX F (IIIC).

Computer print-out of relationships between the academic student variables at College III.

```
            RUN PROCEEDING
TYPE NUMBER OF VARIABLES IN FIRST BLOCK,THE TOTAL
NUMBER OF VARIABLES AND THE NUMBER OF DATA ITEMS
IN EACH VARIABLE
? 4,7,76
CORRELATION BETWEEN ROWS IS AS FOLLOWS.
ROW          ROW          COEFFICIENT OF CORRELATION
 1            1            1
 1            2            .229219
 1            3            .192143E-2
 1            4            .102168
 1            5            .968094E-1
 1            6            .285027
 1            7            .51705E-2
 2            2            1
 2            3            .503767
 2            4            .997692E-1
 2            5            .271707
 2            6            .308186
 2            7            .168026
 3            3            1.
 3            4            .334841
 3            5            .336229
 3            6            .18789
 3            7            .1446
 4            4            1
 4            5            .28227
 4            6            .205305
 4            7            .143566
 5            5            1
 5            6            .232261
 5            7            .338392
 6            6            1
 6            7            .282095
NEXT SECTION IS REGRESSION OF VARIABLES FROM
SECOND BLOCK ON THOSE FROM FIRST BLOCK
LINE OF REGRESSION,Y = A + BX IS AS FOLLOWS:
ROW          ON ROW       Y = A + BX          STANDARD ERROR
 5            1           Y= 2.63474     + .102347 X        .793099
 6            1           Y= 2.09452     + .298279 X        .75605
 7            1           Y= 2.85728     + .657277E-2 X     .958126
 5            2           Y= 2.38517     + .204838 X        .766865
 6            2           Y= 2.49228     + .229986 X        .750376
 7            2           Y= 2.41461     + .152316 X        .944516
 5            3           Y= 1.77851     + .363696 X        .75045
 6            3           Y= 2.51442     + .20118  X        .77472
 7            3           Y= 2.24312     + .188073 X        .948069
 5            4           Y= 2.13049     + .257023 X        .764438
 6            4           Y= 2.56188     + .185048 X        .771966
 7            4           Y= 2.34177     + .157186 X        .948213

            FINISHED
```

APPENDIX F (IIID).

Inter correlations among two predictor and one criterion variable scores for 76 academic students at College III, and Multiple Correlation Coefficient between those three scores considered simultaneously.

	RELATIONSHIP					COEFFICIENT
(a)	EDUCMK	versus	GCALEV			r = 0.27
	EDUCMK	versus	INACAD			r = 0.34
	GCALEV	versus	INACAD			r = 0.50
	EDUCMK	versus	GCALEV	&	INACAD	R = 0.35
(b)	TCHGMK	versus	HEADMA			r = 0.28
	TCHGMK	versus	GCALEV			r = 0.31
	HEADMA	versus	GCALEV			r = 0.23
	TCHGMK	versus	HEADMA	&	GCALEV	R = 0.37
(c)	TCHGMK	versus	HEADMA			r = 0.28
	TCHGMK	versus	INPERS			r = 0.21
	HEADMA	versus	INPERS			r = 0.10
	TCHGMK	versus	HEADMA	&	INPERS	R = 0.33
(d)	TCHGMK	versus	GCALEV			r = 0.31
	TCHGMK	versus	INACAD			r = 0.19
	GCALEV	versus	INACAD			r = 0.10
	TCHGMK	versus	GCALEV	&	INACAD	R = 0.34
(e)	MAINMK	versus	HEADMA			r = 0.01
	MAINMK	versus	INACAD			r = 0.14
	HEADMA	versus	INACAD			r = 0.00
	MAINMK	versus	HEADMA	&	INACAD	R = 0.14
(f)	MAINMK	versus	GCALEV			r = 0.17
	MAINMK	versus	INACAD			r = 0.14
	GCALEV	versus	INACAD			r = 0.50
	MAINMK	versus	GCALEV	&	INACAD	R = 0.18
(g)	MAINMK	versus	INACAD			r = 0.14
	MAINMK	versus	INPERS			r = 0.14
	INACAD	versus	INPERS			r = 0.33
	MAINMK	versus	INACAD	&	INPERS	R = 0.17

APPENDIX F III (E)

Relationships, indicated by correlation coefficients, among the various measures of physical education students' abilities at College III (n = 158).

VARIABLE No. AND NAME.	CORRELATION COEFFICIENTS. (Decimal points omitted)												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1. HEADMA.													
2. GCALEV.	× 18												
3. INACAD.													
4. INPERS.	13	-01											
5. INPRAC.	07	-09		× 18									
6. EDUCMK.	07	×× 32		10	03								
7. TCHGMK.	12	09		× 19	16	×× 27							
8. ENGMAK.													
9. SUBSID.													
10. MAINMK.	06	×× 21		09	04	×× 25	×× 54						
11. PETHEO.													
12. PEDISS.													
13. PEPRAC.													

× - significant at the 5% level.
×× - significant at the 1% level.

APPENDIX F III (F)

Relationships, indicated by correlation coefficients, among the various measures of academic students' abilities at College III (n = 76).

VARIABLE No. AND NAME.	CORRELATION COEFFICIENTS. (Decimal points omitted)												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1. HEADMA.													
2. GCALEV.	x 23												
3. INACAD.	00	xx 50											
4. INPERS.	10	10	xx 33										
5. INPRAC.													
6. EDUCMK.	10	x 27	xx 34	x 28									
7. TCHGMK.	x 28	xx 31	19	21		x 23							
8. ENGMAK.													
9. SUBSID.													
10. MAINMK.	01	17	14	14		xx 34	x 28						
11. PETHEO.													
12. PEDISS.													
13. PEPRAC.													

x - significant at the 5% level.
xx - significant at the 1% level.

APPENDIX F (IVA).

Computer print-out of relationships between the physical education student variables at College IV.

RUN PROCEEDING

TYPE NUMBER OF VARIABLES IN FIRST BLOCK, THE TOTAL NUMBER OF VARIABLES AND THE NUMBER OF DATA ITEMS IN EACH VARIABLE

? 4,8,130

CORRELATION BETWEEN ROWS IS AS FOLLOWS

ROW	ROW	COEFFICIENT OF CORRELATION
1	1	1
1	2	.146658
1	3	-.194013
1	4	.825393E-1
1	5	-.382303E-1
1	6	.117195
1	7	.654347E-1
1	8	.117534
2	2	1
2	3	.136236E-1
2	4	-.13942
2	5	.131671E-2
2	6	.162572
2	7	.236164
2	8	.513905E-1
3	3	1
3	4	.479632E-1
3	5	.146764
3	6	-.174834
3	7	-.125692
3	8	-.201511E-1
4	4	1
4	5	.518758E-1
4	6	.175403E-1
4	7	.150113E-1
4	8	.493916E-1
5	5	1
5	6	.1617
5	7	.201649
5	8	.24264
6	6	1
6	7	.276383
6	8	.210112
7	7	1
7	8	.165745

NEXT SECTION IS REGRESSION OF VARIABLES FROM SECOND BLOCK ON THOSE FROM FIRST BLOCK

LINE OF REGRESSION, Y = A + BX IS AS FOLLOWS:

ROW	ON ROW	Y = A + BX	STANDARD ERROR	
5	1	Y= 3.12022	+-.408459E-1 X	.687696
6	1	Y= 2.55359	+ .162514 X	.887052
7	1	Y= 2.62167	+ .851688E-1 X	.836585
8	1	Y= 2.5478	+ .158459 X	.862397
5	2	Y= 2.9398	+ .170794E-2 X	.688198
6	2	Y= 2.22716	+ .273698 X	.881334
7	2	Y= 1.59522	+ .373185 X	.814667
8	2	Y= 2.90991	+ .841161E-1 X	.867269
5	3	Y= 2.34859	+ .159843 X	.680747
6	3	Y= 4.17008	+-.24714 X	.87946
7	3	Y= 3.60807	+-.166767 X	.831733
8	3	Y= 3.32661	+-.276942E-1 X	.86824
5	4	Y= 2.65038	+ .762898E-1 X	.687272
6	4	Y= 3.11636	+ .334797E-1 X	.893058
7	4	Y= 2.88035	+ .268935E-1 X	.838288
8	4	Y= 2.86773	+ .916575E-1 X	.867355

APPENDIX F (IVB).

Inter-correlations among two predictor and one criterion variable scores for 130 physical education students at College IV, and Multiple Correlation Coefficient between those three scores considered simultaneously.

	RELATIONSHIP					COEFFICIENTS
(a)	EDUCMK	versus	HEADMA			r = -0.04
	EDUCMK	versus	INPERS			r = 0.15
	HEADMA	versus	INPERS			r = -0.19
	EDUCMK	versus	HEADMA	&	INPERS	R = 0.15
(b)	EDUCMK	versus	INACAD			r = 0.00
	EDUCMK	versus	INPERS			r = 0.15
	INACAD	versus	INPERS			r = 0.01
	EDUCMK	versus	INACAD	&	INPERS	R = 0.15
(c)	TCHGMK	versus	HEADMA			r = 0.12
	TCHGMK	versus	INPERS			r = -0.17
	HEADMA	versus	INPERS			r = -0.19
	TCHGMK	versus	HEADMA	&	INPERS	R = 0.19
(d)	TCHGMK	versus	INACAD			r = 0.16
	TCHGMK	versus	INPRAC			r = 0.02
	INACAD	versus	INPRAC			r = -0.14
	TCHGMK	versus	INACAD	&	INPRAC	R = 0.16
(e)	TCHGMK	versus	INPERS			r = -0.17
	TCHGMK	versus	INPRAC			r = 0.02
	INPERS	versus	INPRAC			r = -0.05
	TCHGMK	versus	INPERS	&	INPRAC	R = 0.17
(f)	MAINMK	versus	HEADMA			r = 0.12
	MAINMK	versus	INACAD			r = 0.05
	HEADMA	versus	INACAD			r = 0.15
	MAINMK	versus	HEADMA	&	INACAD	R = 0.12
(g)	MAINMK	versus	HEADMA			r = 0.12
	MAINMK	versus	INPERS			r = -0.02
	HEADMA	versus	INPERS			r = -0.19
	MAINMK	versus	HEADMA	&	INPERS	R = 0.12
(h)	MAINMK	versus	INACAD			r = 0.05
	MAINMK	versus	INPRAC			r = 0.05
	INACAD	versus	INPRAC			r = -0.14
	MAINMK	versus	INACAD	&	INPRAC	R = 0.07

APPENDIX F (IVC).

Computer print-out of relationships between the academic student variables at College IV.

```
RUN PROCEEDING
TYPE NUMBER OF VARIABLES IN FIRST BLOCK,THE TOTAL
NUMBER OF VARIABLES AND THE NUMBER OF DATA ITEMS
IN EACH VARIABLE
←

TIMED OUT 15.35.00
A
RESTARTED AT 15.35.06
← 4,7,62
CORRELATION BETWEEN ROWS IS AS FOLLOWS
ROW          ROW          COEFFICIENT OF CORRELATION
 1            1            1
 1            2            .354845
 1            3           -.236426E-1
 1            4           -.21089E-1
 1            5            .308181E-1
 1            6            .947648E-1
 1            7           -.551468E-1
 2            2            1
 2            3           -.864227E-1
 2            4           -.797465E-2
 2            5            .170543
 2            6            .176898
 2            7           -.574205E-1
 3            3            1
 3            4            .922749E-1
 3            5            .108625
 3            6            .19745E-1
 3            7           -.127228
 4            4            1
 4     0      5           -.147009R
 4            6            .250824
 4            7            .438293
 5            5            1.
 5            6            .195177
 5            7            .403089E-1
 6            6            1
 6            7            .107184
NEXT SECTION IS REGRESSION OF VARIABLES FROM
SECOND BLOCK ON THOSE FROM FIRST BLOCK
LINE OF REGRESSION,Y = A + BX IS AS FOLLOWS:
ROW          ON ROW       Y = A + BX      STANDARD ERROR
 5            1           Y= 2.63331      + .268306E-1 X   .603465
 6            1           Y= 2.78256      + .113471 X      .826634
 7            1           Y= 3.50699      +-.614869E-1 X   .772031
 5            2           Y= 2.1029       + .180913 X      .594907
 6            2           Y= 2.33029      + .258091 X      .817275
 7            2           Y= 3.53361      +-.780083E-1 X   .771932
 5            3           Y= 2.29032      + .129032 X      .600179
 6            3           Y= 3.12903      + .322581E-1 X   .830209
 7            3           Y= 3.93548      +-.193548 X      .766924
 5            4           Y= 3.37843      +-.166509 X      .597192
 6            4           Y= 1.74834      + .390728 X      .803826
 7            4           Y= .827815      + .635762 X      .694984

                  FINISHED
```

APPENDIX F (IVD).

Inter correlations among two predictor and one criterion variable scores for 62 academic students at College IV, and Multiple Correlation Coefficient between those three scores considered simultaneously.

	RELATIONSHIP					COEFFICIENTS
(a)	EDUCMK	versus	INACAD			r = 0.17
	EDUCMK	versus	INPERS			r = 0.11
	INACAD	versus	INPERS			r = 0.09
	EDUCMK	versus	INACAD	&	INPERS	R = 0.19
(b)	EDUCMK	versus	INACAD			r = 0.17
	EDUCMK	versus	INPRAC			r = -0.01
	INACAD	versus	INPRAC			r = -0.01
	EDUCMK	versus	INACAD	&	INPRAC	R = 0.17
(c)	TCHGMK	versus	HEADMA			r = 0.09
	TCHGMK	versus	INPRAC			r = 0.25
	HEADMA	versus	INPRAC			r = -0.02
	TCHGMK	versus	HEADMA	&	INPRAC	R = 0.26
(d)	TCHGMK	versus	INPERS			r = 0.02
	TCHGMK	versus	INPRAC			r = 0.25
	INPERS	versus	INPRAC			r = 0.09
	TCHGMK	versus	INPERS	&	INPRAC	R = 0.25
(e)	MAINMK	versus	HEADMA			r = -0.06
	MAINMK	versus	INPRAC			r = 0.44
	HEADMA	versus	INPRAC			r = -0.02
	MAINMK	versus	HEADMA	&	INPRAC	R = 0.44
(f)	MAINMK	versus	INACAD			r = -0.06
	MAINMK	versus	INPERS			r = -0.13
	INACAD	versus	INPERS			r = -0.09
	MAINMK	versus	INACAD	&	INPERS	R = 0.14

APPENDIX F (VA).

Computer print-out of relationships between the physical education student variables at College V.

RUN PROCEEDING
TYPE NUMBER OF VARIABLES IN FIRST BLOCK, THE TOTAL NUMBER OF VARIABLES AND THE NUMBER OF DATA ITEMS IN EACH VARIABLE
= 5,9,81
CORRELATION BETWEEN ROWS IS AS FOLLOWS

ROW	ROW	COEFFICIENT OF CORRELATION
1	1	1
1	2	-.422649E-1
1	3	-.357201E-1
1	4	.203395
1	5	.632448E-1
1	6	-.117592
1	7	.153506
1	8	-.866581E-1
1	9	.518733E-1
2	2	1
2	3	.487407E-1
2	4	-.145123
2	5	.386596E-1
2	6	.305196
2	7	.121443
2	8	.253008
2	9	.157101
3	3	1.
3	4	.32752
3	5	.187068E-1
3	6	.860343E-1
3	7	.228588E-1
3	8	.138827
3	9	-.838803E-1
4	4	1
4	5	.104713E-1
4	6	-.998412E-1
4	7	.19993E-1
4	8	-.844672E-1
4	9	-.103743
5	5	1
5	6	-.196303
5	7	-.442154E-1
5	8	-.335397
5	9	.906845E-2
6	6	1
6	7	.406363
6	8	.454803
6	9	.462842
7	7	1
7	8	.147529
7	9	.500387
8	8	1
8	9	.261514

NEXT SECTION IS REGRESSION OF VARIABLES FROM
SECOND BLOCK ON THOSE FROM FIRST BLOCK
LINE OF REGRESSION, Y = A + BX IS AS FOLLOWS:

ROW	ON ROW	Y = A + BX	STANDARD ERROR
6	1	Y= 3.41529	+-.690245E-1 X .431473
7	1	Y= 2.9806	+ .132345 X .630599
8	1	Y= 3.34398	+-.530519E-1 X .451445
9	1	Y= 3.16229	+ .396463E-1 X .564968
6	2	Y= 2.74525	+ .150829 X .413758
7	2	Y= 3.22645	+ .88152E-1 X .633439
8	2	Y= 2.78912	+ .130408 X .438406
9	2	Y= 3.03033	+ .101092 X .558705
6	3	Y= 2.93972	+ .72695E-1 X .432877
7	3	Y= 3.38298	+ .283688E-1 X .637996
8	3	Y= 2.7766	+ .12234 X .448762
9	3	Y= 3.58865	+-.921986E-1 X .56374
6	4	Y= 3.41409	+-.787037E-1 X .432317
7	4	Y= 3.39455	+ .231481E-1 X .638035
8	4	Y= 3.37191	+-.694444E-1 X .45153
9	4	Y= 3.65175	+-.106481 X .562677
6	5	Y= 3.52778	+-.116667 X .426034
7	5	Y= 3.59064	+-.385965E-1 X .637538
8	5	Y= 3.80263	+-.207895 X .426902
9	5	Y= 3.28655	+ .701754E-2 X .565706

FINISHED

APPENDIX F (VB).

Inter-correlations among two predictor and one criterion variable scores for 81 physical education students at College V, and Multiple Correlation Coefficient between those three scores considered simultaneously.

	RELATIONSHIP					COEFFICIENTS
(a)	EDUCMK	versus	HEADMA			r = -0.12
	EDUCMK	versus	INPRAC			r = -0.20
	HEADMA	versus	INPRAC			r = 0.06
	EDUCMK	versus	HEADMA	&	INPRAC	R = 0.22
(b)	EDUCMK	versus	GCALEV			r = 0.31
	EDUCMK	versus	INACAD			r = 0.09
	GCALEV	versus	INACAD			r = 0.05
	EDUCMK	versus	GCALEV	&	INACAD	R = 0.31
(c)	EDUCMK	versus	GCALEV			r = 0.31
	EDUCMK	versus	INPERS			r = -0.10
	GCALEV	versus	INPERS			r = -0.15
	EDUCMK	versus	GCALEV	&	INPERS	R = 0.31
(d)	EDUCMK	versus	INPERS			r = -0.10
	EDUCMK	versus	INPRAC			r = -0.20
	INPERS	versus	INPRAC			r = 0.01
	EDUCMK	versus	INPERS	&	INPRAC	R = 0.22
(e)	TCHGMK	versus	HEADMA			r = 0.15
	TCHGMK	versus	GCALEV			r = 0.12
	HEADMA	versus	GCALEV			r = -0.04
	TCHGMK	versus	HEADMA	&	GCALEV	R = 0.19
(f)	TCHGMK	versus	GCALEV			r = 0.12
	TCHGMK	versus	INPERS			r = 0.02
	GCALEV	versus	INPERS			r = -0.15
	TCHGMK	versus	GCALEV	&	INPERS	R = 0.12
(g)	SUBSID	versus	GCALEV			r = 0.25
	SUBSID	versus	INACAD			r = 0.14
	GCALEV	versus	INACAD			r = 0.05
	SUBSID	versus	GCALEV	&	INACAD	R = 0.28
(h)	SUBSID	versus	GCALEV			r = 0.25
	SUBSID	versus	INPERS			r = -0.08
	GCALEV	versus	INPERS			r = -0.15
	SUBSID	versus	GCALEV	&	INPERS	R = 0.25
(i)	SUBSID	versus	INACAD			r = 0.14
	SUBSID	versus	INPERS			r = -0.08
	INACAD	versus	INPERS			r = 0.33
	SUBSID	versus	INACAD	&	INPERS	R = 0.19

	RELATIONSHIP					COEFFICIENTS
(j)	SUBSID	versus	INPERS			r = -0.08
	SUBSID	versus	INPRAC			r = -0.34
	INPERS	versus	INPRAC			r = 0.02
	SUBSID	versus	INPERS	&	INPRAC	R = 0.34
(k)	MAINMK	versus	HEADMA			r = 0.05
	MAINMK	versus	GCALEV			r = 0.16
	HEADMA	versus	GCALEV			r = -0.04
	MAINMK	versus	HEADMA	&	GCALEV	R = 0.16
(l)	MAINMK	versus	GCALEV			r = 0.16
	MAINMK	versus	INPRAC			r = -0.01
	GCALEV	versus	INPRAC			r = 0.04
	MAINMK	versus	GCALEV	&	INPRAC	R = 0.16
(m)	MAINMK	versus	INACAD			r = -0.08
	MAINMK	versus	INPERS			r = -0.10
	INACAD	versus	INPERS			r = 0.33
	MAINMK	versus	INACAD	&	INPERS	R = 0.11

APPENDIX F (VC).

Computer print-out of relationships between the academic student variables at College V.

```
                RUN PROCEEDING
TYPE NUMBER OF VARIABLES IN FIRST BLOCK, THE TOTAL
NUMBER OF VARIABLES AND THE NUMBER OF DATA ITEMS
IN EACH VARIABLE
- 4,8,147
CORRELATION BETWEEN ROWS IS AS FOLLOWS
ROW             ROW             COEFFICIENT OF CORRELATION
 1               1               1
 1               2               .226955E-1
 1               3               .776642E-1
 1               4               .256302
 1               5               .160888
 1               6               .166846
 1               7               .438658E-1
 1               8              -.202042E-1
 2               2               1
 2               3               .412894
 2               4               .23922
 2               5               .638148E-1
 2               6              -.431596E-2
 2               7               .113217
 2               8              -.175333E-1
 3               3               1
 3               4               .483336
 3               5               .157979
 3               6               .404443E-1
 3               7               .337566E-1
 3               8               .251681E-1
 4               4               1
 4               5               .235196
 4               6               .141123
 4               7               .410553E-1
 4               8               .776147E-1
 5               5               1
 5               6               .251207
 5               7               .159634
 5               8               .196252
 6               6               1
 6               7               .308169
 6               8               .311916
 7               7               1
 7               8               .111514
```

NEXT SECTION IS REGRESSION OF VARIABLES FROM
SECOND BLOCK ON THOSE FROM FIRST BLOCK
LINE OF REGRESSION, Y = A + BX IS AS FOLLOWS:

ROW	ON ROW	Y = A + BX	STANDARD ERROR
5	1	Y= 2.80525	+ .133512 X .61336
6	1	Y= 2.92956	+ .146227 X .647136
7	1	Y= 3.23808	+ .378116E-1 X .644903
8	1	Y= 3.32491	+-.165635E-1 X .613811
5	2	Y= 3.15621	+ .399088E-1 X .620189
6	2	Y= 3.46503	+-.285063E-2 X .65633
7	2	Y= 3.1355	+ .735462E-1 X .641374
8	2	Y= 3.30046	+-.108324E-1 X .613842
5	3	Y= 2.7939	+ .165819 X .613651
6	3	Y= 3.32281	+ .44834E-1 X .655799
7	3	Y= 3.26499	+ .368041E-1 X .645157
8	3	Y= 3.1879	+ .260974E-1 X .613742
5	4	Y= 2.40631	+ .278004 X .604022
6	4	Y= 2.89851	+ .176171 X .649767
7	4	Y= 3.2147	+ .504073E-1 X .64498
8	4	Y= 2.97862	+ .906314E-1 X .612084

FINISHED

APPENDIX F (VD).

Inter correlations among two predictor and one criterion variable scores for 147 academic students at College V, and Multiple Correlation Coefficient between those three scores considered simultaneously.

	RELATIONSHIP					COEFFICIENTS
(a)	EDUCMK	versus	HEADMA			r = 0.16
	EDUCMK	versus	GCALEV			r = 0.06
	HEADMA	versus	GCALEV			r = 0.02
	EDUCMK	versus	HEADMA	&	GCALEV	R = 0.17
(b)	EDUCMK	versus	HEADMA			r = 0.16
	EDUCMK	versus	INPERS			r = 0.24
	HEADMA	versus	INPERS			r = 0.26
	EDUCMK	versus	HEADMA	&	INPERS	R = 0.26
(c)	EDUCMK	versus	INACAD			r = 0.15
	EDUCMK	versus	INPERS			r = 0.24
	INACAD	versus	INPERS			r = 0.48
	EDUCMK	versus	INACAD	&	INPERS	R = 0.24
(d)	TCHGMK	versus	HEADMA			r = 0.17
	TCHGMK	versus	GCALEV			r = -0.01
	HEADMA	versus	GCALEV			r = 0.02
	TCHGMK	versus	HEADMA	&	GCALEV	R = 0.17
(e)	TCHGMK	versus	HEADMA			r = 0.17
	TCHGMK	versus	INPERS			r = 0.14
	HEADMA	versus	INPERS			r = 0.26
	TCHGMK	versus	HEADMA	&	INPERS	R = 0.19
(f)	SUBSID	versus	GCALEV			r = 0.11
	SUBSID	versus	INACAD			r = 0.03
	GCALEV	versus	INACAD			r = 0.41
	SUBSID	versus	GCALEV	&	INACAD	R = 0.11
(g)	MAINMK	versus	INACAD			r = 0.03
	MAINMK	versus	INPERS			r = 0.08
	INACAD	versus	INPERS			r = 0.48
	MAINMK	versus	INACAD	&	INPERS	R = 0.08

APPENDIX F V (E)

Relationships, indicated by correlation coefficients, among the various measures of physical education students' abilities at College V (n = 81).

VARIABLE No. AND NAME.	CORRELATION COEFFICIENTS. (Decimal points omitted)												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1. HEADMA.													
2. GCALEV.	-04												
3. INACAD.	-04	05											
4. INPERS.	20	-15	xx 33										
5. INPRAC.	06	04	02	01									
6. EDUCMK.	-12	xx 31	09	-10	-20								
7. TCHGMK.	15	12	02	02	-04	xx 41							
8. ENGMAK.													
9. SUBSID.	-09	x 25	14	-08	xx -34	xx 45	15						
10. MAINMK.	05	16	-08	-10	-01	xx 46	xx 50		x 26				
11. PETHEO.													
12. PEDISS.													
13. PEPRAC.													

x - significant at the 5% level.
xx - significant at the 1% level.

APPENDIX F V (F)

Relationships, indicated by correlation coefficients, among the various measures of academic students' abilities at College V (n = 147).

VARIABLE No. AND NAME.	CORRELATION COEFFICIENTS. (Decimal points omitted)												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1. HEADMA.													
2. GCALEV.	02												
3. INACAD.	08	xx 41											
4. INPERS.	xx 26	xx 24	xx 48										
5. INPRAC.													
6. EDUCMK.	x 16	06	15	xx 24									
7. TCHGMK.	x 17	-00	04	14		xx 25							
8. ENGMAK.													
9. SUBSID.	04	11	03	04		15	xx 31						
10. MAINMK.	-02	-02	03	08		x 19	xx 31		11				
11. PETHEO.													
12. PEDISS.													
13. PEPRAC.													

x - significant at the 5% level.
xx - significant at the 1% level.

APPENDIX F (VIA).

Computer print-out of relationships between the physical education student variables at College VI.

```
            RUN PROCEEDING
TYPE NUMBER OF VARIABLES IN FIRST BLOCK,THE TOTAL
NUMBER OF VARIABLES AND THE NUMBER OF DATA ITEMS
IN EACH VARIABLE
- 3,7,191
CORRELATION BETWEEN ROWS IS AS FOLLOWS
ROW             ROW             COEFFICIENT OF CORRELATION
 1               1               1
 1               2               .247893
 1               3               .111476
 1               4               .157647
 1               5               .198418
 1               6               .614766E-1
 1               7               .158152
 2               2               1
 2               3               .434079
 2               4               .98269E-1
 2               5               .171013
 2               6               .838008E-1
 2               7               .2563
 3               3               1
 3               4               -.142881E-1
 3               5               .163852
 3               6               .413018E-1
 3               7               .205312
 4               4               1
 4               5               .120738
 4               6               .483523
 4               7               .497778
 5               5               1
 5               6               .8703E-1
 5               7               .342351
 6               6               1
 6               7               .447399
NEXT SECTION IS REGRESSION OF VARIABLES FROM
SECOND BLOCK ON THOSE FROM FIRST BLOCK
LINE OF REGRESSION,Y = A + BX IS AS FOLLOWS:
ROW             ON ROW          Y = A + BX      STANDARD ERROR
 4               1              Y= 2.39829      + .173985 X       .744629
 5               1              Y= 2.38737      + .230002 X       .77626
 6               1              Y= 2.87723      + .7554E-1    X   .837959
 7               1              Y= 2.46558      + .198315 X       .845977
 4               2              Y= 2.5617       + .145213 X       .750408
 5               2              Y= 2.3234       + .265426 X       .78034
 6               2              Y= 2.66298      + .137872 X       .836594
 7               2              Y= 1.64255      + .430319 X       .828142
 4               3              Y= 3.14339      +-.855178E-2 X    .753981
 5               3              Y= 2.99532      + .103005 X       .781303
 6               3              Y= 3.0977       + .275228E-1 X    .838831
 7               3              Y= 2.82219      + .139621 X       .838508

            FINISHED
```

APPENDIX F (VIB).

Inter correlations among two predictor and one criterion variable scores for 191 physical education students at College VI, and Multiple Correlation Coefficient between those three scores considered simultaneously.

	RELATIONSHIP					COEFFICIENTS
(a)	EDUCMK	versus	HEADMA			r = 0.16
	EDUCMK	versus	INPERS			r = 0.10
	HEADMA	versus	INPERS			r = 0.25
	EDUCMK	versus	HEADMA	&	INPERS	R = 0.17
(b)	EDUCMK	versus	HEADMA			r = 0.16
	EDUCMK	versus	INPRAC			r = -0.01
	HEADMA	versus	INPRAC			r = 0.11
	EDUCMK	versus	HEADMA	&	INPRAC	R = 0.16
(c)	TCHGMK	versus	HEADMA			r = 0.20
	TCHGMK	versus	INPERS			r = 0.17
	HEADMA	versus	INPERS			r = 0.25
	TCHGMK	versus	HEADMA	&	INPERS	R = 0.23
(d)	TCHGMK	versus	HEADMA			r = 0.20
	TCHGMK	versus	INPRAC			r = 0.16
	HEADMA	versus	INPRAC			r = 0.11
	TCHGMK	versus	HEADMA	&	INPRAC	R = 0.24
(e)	TCHGMK	versus	INPERS			r = 0.17
	TCHGMK	versus	INPRAC			r = 0.16
	INPERS	versus	INPRAC			r = 0.43
	TCHGMK	versus	INPERS	&	INPRAC	R = 0.19
(f)	SUBSID	versus	HEADMA			r = 0.06
	SUBSID	versus	INPERS			r = 0.08
	HEADMA	versus	INPERS			r = 0.25
	SUBSID	versus	HEADMA	&	INPERS	R = 0.09
(g)	MAINMK	versus	HEADMA			r = 0.16
	MAINMK	versus	INPRAC			r = 0.21
	HEADMA	versus	INPRAC			r = 0.11
	MAINMK	versus	HEADMA	&	INPRAC	R = 0.25
(h)	MAINMK	versus	INPERS			r = 0.26
	MAINMK	versus	INPRAC			r = 0.21
	INPERS	versus	INPRAC			r = 0.43
	MAINMK	versus	INPERS	&	INPRAC	R = 0.28

APPENDIX F VI (c)

Relationships, indicated by correlation coefficients, among the various measures of physical education students' abilities at College VI (n = 191).

VARIABLE No. AND NAME.	CORRELATION COEFFICIENTS. (Decimal points omitted)												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1. HEADMA.													
2. GCALEV.													
3. INACAD.													
4. INPERS.	xx 25												
5. INPRAC.	11			xx 43									
6. EDUCMK.	x 16			10	-01								
7. TCHGMK.	xx 20			x 17	x 16	12							
8. ENGMAK.													
9. SUBSID.	06			08	04	xx 48	09						
10. MAINMK.	x 16			xx 26	xx 21	xx 50	xx 34		xx 45				
11. PETHEO.													
12. PEDISS.													
13. PEPRAC.													

x - significant at the 5% level.
xx - significant at the 1% level.

APPENDIX F (VIIA).

Summary of physical education students' achievements at College VII and chi-square values. (Yates's correction applied. n = 79.)

VARIABLE 5 (INPRAC).

		HIGH SCORE	LOW SCORE	X^2
VARIABLE 6 (EDUCMK)	HIGH SCORE	14	22	5.19
	LOW SCORE	6	37	
VARIABLE 7 (TCHGMK)	HIGH SCORE	16	24	7.73
	LOW SCORE	4	35	
VARIABLE 9 (SUBSID)	HIGH SCORE	15	12	17.48
	LOW SCORE	5	47	
VARIABLE 10 (MAINMK)	HIGH SCORE	18	13	26.16
	LOW SCORE	2	46	

VARIABLE 6 (EDUCMK)

		HIGH SCORE	LOW SCORE	χ^2
VARIABLE 7 (TCHGMK)	HIGH SCORE	19	20	6.02
	LOW SCORE	8	32	
VARIABLE 9 (SUBSID)	HIGH SCORE	21	6	31.78
	LOW SCORE	6	46	
VARIABLE 10 (MAINMK)	HIGH SCORE	17	14	10.98
	LOW SCORE	8	40	

VARIABLE 7 (TCHGMK)

		HIGH SCORE	LOW SCORE	χ^2
VARIABLE 9 (SUBSID)	HIGH SCORE	20	7	8.57
	LOW SCORE	19	33	
VARIABLE 10 (MAINMK)	HIGH SCORE	23	8	10.99
	LOW SCORE	16	32	

VARIABLE 9 (SUBSID)

		HIGH SCORE	LOW SCORE	χ^2
VARIABLE 10 (MAINMK)	HIGH SCORE	21	10	23.15
	LOW SCORE	6	42	

APPENDIX F (VIIIA).

Summary of physical education students' achievements at College VIII and chi-square values. (Yates's correction applied. n = 65.)

VARIABLE 1 (HEADMA)

		HIGH SCORE	LOW SCORE	χ^2
VARIABLE 4 (INPERS)	HIGH SCORE	14	5	0.14
	LOW SCORE	30	16	
VARIABLE 5 (INPRAC)	HIGH SCORE	26	13	0.003
	LOW SCORE	18	8	
VARIABLE 6 (EDUCMK)	HIGH SCORE	0	0	0.00
	LOW SCORE	44	21	
VARIABLE 7 (TCHGMK)	HIGH SCORE	3	0	0.35
	LOW SCORE	41	21	
VARIABLE 9 (SUBSID)	HIGH SCORE	8	6	0.24
	LOW SCORE	35	16	
VARIABLE 10 (MAINMK)	HIGH SCORE	21	7	1.09
	LOW SCORE	22	15	

VARIABLE 4 (INPERS)

		HIGH SCORE	LOW SCORE	χ^2
VARIABLE 5 (INPRAC)	HIGH SCORE	17	22	8.06
	LOW SCORE	2	24	
VARIABLE 6 (EDUCMK)	HIGH SCORE	0	0	0.00
	LOW SCORE	19	46	
VARIABLE 7 (TCHGMK)	HIGH SCORE	1	3	0.14
	LOW SCORE	18	43	
VARIABLE 9 (SUBSID)	HIGH SCORE	6	7	1.02
	LOW SCORE	14	38	
VARIABLE 10 (MAINMK)	HIGH SCORE	10	17	0.21
	LOW SCORE	12	26	

VARIABLE 5 (INPRAC)

		HIGH SCORE	LOW SCORE	χ^2
VARIABLE 6 (EDUCMK)	High SCORE	0	0	0.00
	LOW SCORE	39	26	
VARIABLE 7 (TCHGMK)	HIGH SCORE	2	1	0.13
	LOW SCORE	37	25	
VARIABLE 9 (SUBSID)	HIGH SCORE	6	6	0.21
	LOW SCORE	33	20	
VARIABLE 10 (MAINMK)	HIGH SCORE	21	7	3.15
	LOW SCORE	18	18	

VARIABLE 6 (EDUCMK)

		HIGH SCORE	LOW SCORE	χ^2
VARIABLE 7 (TCHGMK)	HIGH SCORE	0	3	0.00
	LOW SCORE	0	62	
VARIABLE 9 (SUBSID)	HIGH SCORE	0	12	0.00
	LOW SCORE	0	53	
VARIABLE 10 (MAINMK)	HIGH SCORE	0	28	0.00
	LOW SCORE	0	37	

VARIABLE 7 (TCHGMK)

		HIGH SCORE	LOW SCORE	χ^2
VARIABLE 9 (SUBSID)	HIGH SCORE	0	12	0.01
	LOW SCORE	3	50	
VARIABLE 10 (MAINMK)	HIGH SCORE	3	25	2.08
	LOW SCORE	0	37	

VARIABLE 9 (SBUSID)

		HIGH SCORE	LOW SCORE	χ^2
VARIABLE 10 (MAINMK)	HIGH SCORE	2	26	3.77
	LOW SCORE	11	26	

APPENDIX F (IXA)

Summary of physical education students' achievements at College IX and chi-square values. (Yates's correction applied. n = 98).

VARIABLE 5 (INPRAC)

		HIGH SCORE	LOW SCORE	χ^2
VARIABLE 6 (EDUCMK)	HIGH SCORE	3	8	0.11
	LOW SCORE	24	63	
VARIABLE 7 (TCHGMK)	HIGH SCORE	6	9	0.74
	LOW SCORE	21	62	
VARIABLE 10 (MAINMK)	HIGH SCORE	20	40	1.90
	LOW SCORE	7	31	

VARIABLE 6 (EDUCMK)

		HIGH SCORE	LOW SCORE	χ^2
VARIABLE 7 (TCHGMK)	HIGH SCORE	2	13	0.88
	LOW SCORE	3	80	
VARIABLE 10 (MAINMK)	HIGH SCORE	4	54	0.08
	LOW SCORE	3	37	

VARIABLE 7 (TCHGMK)

		HIGH SCORE	LOW SCORE	χ^2
VARIABLE 10 (MAINMK)	HIGH SCORE	14	47	5.81
	LOW SCORE	1	36	

APPENDIX F (XA)

Summary of physical education students' achievements at College X and chi-square values. (Yates's correction applied. n = 117).

VARIABLE 5 (INPRAC)

		HIGH SCORE	LOW SCORE	χ^2
VARIABLE 6 (EDUCMK)	HIGH SCORE	1	12	2.18
	LOW SCORE	33	71	
VARIABLE 7 (TCHGMK)	HIGH SCORE	2	13	0.85
	LOW SCORE	29	73	
VARIABLE 9 (SUBSID)	HIGH SCORE	1	14	2.40
	LOW SCORE	30	72	
VARIABLE 10 (MAINMK)	HIGH SCORE	6	29	1.61
	LOW SCORE	25	57	

VARIABLE 6 (EDUCMK)

		HIGH SCORE	LOW SCORE	χ^2
VARIABLE 7 (TCHGMK)	HIGH SCORE	5	11	3.28
	LOW SCORE	11	90	
VARIABLE 9 (SUBSID)	HIGH SCORE	5	8	5.43
	LOW SCORE	11	93	
VARIABLE 10 (MAINMK)	HIGH SCORE	12	23	15.57
	LOW SCORE	4	78	

VARIABLE 7 (TCHGMK)

		HIGH SCORE	LOW SCORE	χ^2
VARIABLE 9 (SUBSID)	HIGH SCORE	1	12	0.06
	LOW SCORE	15	89	
VARIABLE 10 (MAINMK)	HIGH SCORE	13	22	18.05
	LOW SCORE	4	78	

VARIABLE 9 (SUBSID)

		HIGH SCORE	LOW SCORE	χ^2
VARIABLE 10 (MAINMK)	HIGH SCORE	6	29	1.07
	LOW SCORE	7	75	

Relationships between colleges' assessments and personality profiles (as measured by CatteLL's 16 P.F. questionnaire) of 94 physical education students at College I.

CORRELATION COEFFICIENTS. (Decimal points omitted)

⊗⊗ - significant at the 1% level. ⊗ - significant at the 5% level.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	32.
HEADMA. 1.																																
GCALEV. 2.	17																															
INACAD. 3.	10	⊗⊗ 35																														
INPERS. 4.	09	⊗⊗ 26	⊗⊗ 30																													
INPRAC. 5.	04	07	-04	12																												
EDUCMK. 6.	09	⊗⊗ 29	02	14	-12																											
TCHGMK. 7.	12	05	-05	03	⊗ 21	⊗⊗ 27																										
ENGMAK. 8.	12	16	04	11	09	19	⊗ 22																									
SUBSID. 9.	07	17	01	14	06	⊗⊗ 28	14	⊗⊗ 26																								
MAINMK. 10.	06	⊗⊗ 31	-02	-07	06	⊗⊗ 48	⊗⊗ 30	19	⊗⊗ 28																							
PETHEO. 11.	07	⊗⊗ 28	-05	-09	-03	⊗⊗ 45	⊗ 24	10	17	⊗⊗ 67																						
PEDISS. 12.	01	⊗ 24	14	-12	05	⊗⊗ 31	⊗ 23	⊗⊗ 32	16	⊗⊗ 65	⊗⊗ 40																					
PEPRAC. 13.	-11	00	⊗ -21	-03	⊗ 24	17	⊗ 25	12	13	⊗⊗ 55	⊗ 23	⊗⊗ 29																				
FACTRA. 14.	-15	-10	-05	-08	-12	16	15	-10	09	19	15	10	05																			
FACTRB. 15.	00	11	-03	-07	⊗ 21	11	03	01	-05	⊗⊗ 37	⊗⊗ 39	⊗⊗ 34	⊗⊗ 31	01																		
FACTRC. 16.	-05	05	-17	-08	-14	⊗⊗ 32	02	00	-10	17	19	08	07	10	10																	
FACTRB. 17.	00	10	07	-04	16	-09	⊗ 20	-11	-18	02	-02	-01	09	09	-05	-15																
			⊗		01	13	08	-02	-09	⊗ 20	⊗⊗ 27	14	-02	⊗⊗ 28	13	10	⊗⊗ 46															
					-06	⊗ 25	06	⊗ 25	19	19	19	⊗⊗ 27	11	07	-04	⊗⊗ 29	⊗⊗ -42	⊗⊗ -27														
					17	05	⊗⊗ 26	-02	-12	⊗⊗ 28	⊗⊗ 36	19	19	⊗⊗ 31	⊗ 22	12	⊗⊗ 43	⊗⊗ 42	-11													
					11	09	02	⊗⊗ 27	⊗ 20	-02	-14	01	-11	-10	-18	-13	04	-12	-16	-09												
					17	04	10	05	10	13	10	01	12	14	13	-30	⊗⊗ 27	19	⊗ -22	16	-08											
					03	06	-12	⊗ 22	⊗ -21	-15	-17	-04	-19	-16	-07	-10	05	03	⊗ -22	03	⊗⊗ 29	-11									
FACTRN. 24.	-04	-04	03	08	04	08	-13	-12	02	06	03	17	-02	⊗ 20	12	09	-18	-00	16	11	-13	-12	08									
FACTRO. 25.	-12	04	05	-01	05	-04	-01	02	01	-09	⊗⊗ -32	-16	-00	-02	-18	⊗⊗ -36	16	-06	-15	⊗ -24	⊗⊗ 29	⊗ 21	17	00								
FACTQ1. 26.	03	-06	-15	08	12	-05	05	-01	-05	-00	-07	07	01	-08	-01	07	15	11	-01	16	07	04	-04	11	-13							
FACTQ2. 27.	-01	11	18	17	-03	-12	-17	17	-06	⊗⊗ -32	⊗⊗ -39	⊗ -21	⊗⊗ -29	⊗⊗ -28	⊗⊗ 26	-19	-08	⊗⊗ -32	-11	⊗⊗ -40	⊗⊗ 34	-01	⊗⊗ 32	-16	⊗⊗ 29	-10						
[illegible]	[illegible]													⊗⊗ -33	-19	-08	⊗⊗ -32	-11	⊗⊗ -40	⊗⊗ 34	-01	⊗⊗ 32	-16	⊗⊗ 29	-10						
FACTQ4. 29.	-10	-01	04	03	14	⊗⊗ -26	-03	-02	-07	-03	⊗ -24	-11	07	-08	⊗⊗ 26	⊗⊗ 33	⊗⊗ -35	⊗⊗ -22	⊗⊗ 39	04	⊗ -22	⊗⊗ -28	-03	⊗ 20	⊗⊗ -47	01	⊗ -21					
FACT2E. 30.	-05	02	-14	-14	14	04	⊗ 21	-05	-13	⊗⊗ 27	⊗⊗ 31	19	⊗ 20	-18	04	-62	30	04	-38	-14	03	⊗ 40	-10	-10	⊗⊗ 46	-07	19	⊗⊗ -41			
FACT2A. 31.	-14	-03	07	-03	06	⊗ -20	-08	-03	07	-14	⊗⊗ -34	⊗ -20	-03	⊗⊗ 42	⊗ 20	12	⊗⊗ 60	⊗⊗ 74	⊗ -21	⊗⊗ 82	-16	⊗ 23	-04	04	-16	16	⊗⊗ -50	-07	-02			
FACT2T. 32.	-04	-12	-15	⊗⊗ -26	-03	-04	-01	⊗⊗ -26	⊗ -22	08	⊗ 23	05	13	-11	-13	⊗⊗ -69	⊗ 21	-02	⊗⊗ -32	⊗⊗ -36	13	⊗⊗ 48	03	-15	⊗⊗ 71	-09	⊗⊗ 29	⊗⊗ -64	⊗⊗ 83	-17		
														-12	⊗ 24	⊗⊗ 34	16	⊗⊗ 34	07	19	⊗⊗ -82	02	⊗⊗ -34	⊗ 20	⊗⊗ -35	05	⊗⊗ -37	⊗ 23	-05	⊗⊗ 32	⊗ -24	

APPENDIX H (A).

Homogeneity of variance check of the achievements of lecturers, inspectors and schoolteachers during their college careers.

College assessments of students' abilities.	Lecturers. (n = 45)			Inspectors. (n = 17)			Schoolteachers. (n = 78)			F value
	Means	s	s^2	Means	s	s^2	Means	s	s^2	
Personality interview	3.18	0.39	0.15	3.41	0.51	0.26	3.19	0.43	0.18	n.s. 1.72
Practical interview	3.58	0.54	0.29	3.71	0.47	0.22	3.40	0.57	0.32	n.s. 1.45
Teaching marks	3.71	0.69	0.48	3.82	0.73	0.53	3.38	0.56	0.32	n.s. 1.67
"Method" examination	3.64	0.61	0.37	3.76	0.66	0.44	3.18	0.66	0.43	n.s. 1.19
Anatomy examination	3.27	0.81	0.65	3.00	0.71	0.50	2.89	0.68	0.47	n.s. 1.40
Physiology examination	3.33	0.77	0.59	3.18	0.64	0.40	2.90	0.79	0.62	n.s. 1.53
"Principles" examination	3.58	0.66	0.43	3.41	0.62	0.38	3.35	0.70	0.49	n.s. 1.28
Practical P.E. examination	3.64	0.80	0.64	3.29	0.59	0.35	3.18	0.86	0.75	n.s. 2.16
Overall Final assessment	3.49	0.51	0.26	3.47	0.51	0.26	3.24	0.43	0.19	n.s. 1.42

APPENDIX I (A).

Details of the physical education students rejected by College I.

(n = 95)

APPLICANT No.	TYPE of SCHOOL ATTENDED	MAIN SUBJECT	G.C.E. RESULTS BEFORE / AFTER INTERVIEW 'A' LEVEL.		'O' LEVEL.		INTERVIEW GRADES ACADEMIC	PERSONALITY	PRACTICAL.	INTERVIEW COMMENTS	EVENTUAL CAREER.
ADMITTED TO UNIVERSITIES											
1	GMR	P.E.	0	7	4	8	B	C	D	Not a very lively person.	B.A.(Hons.) + Cert. Ed.
2	GMR	P.E.	0	7	3	7	C+	D	B	Not impressive.	B.Sc. II ii Physics.
3	GMR	P.E.	2	7	3	8	B-	C-	C	Indecisive.	Honours degree.
4	COMP	P.E.	0	5	3	6	D+	D	B+	Little force of character.	B.Sc. II ii Psychology.
		MEANS	0	7	3	7	C+	D+	C+		
ADMITTED TO POLYTECHNICS											
5	GMR	P.E.	0	6	3	6	C	C	C	Limited combination of subjects.	Polytechnic (ongoing).
6	GMR	P.E.	0	6	2	6	C	C	B-	Not strong enough for teaching.	Polytechnic B.Sc. (Hons.)
7	GMR	P.E.	0	5	1	5	C	A	D-	Low opinion of his own ability.	Polytechnic (ongoing).
8	S.MOD	P.E.	0	4	1	5	C-	C-	D+	Little interest in academic work.	Polytechnic (ongoing).
9	GMR	P.E.	0	8	1	8	B-	B-	D	Sincere, looks a hard worker.	Polytechnic R.I.C.S.
		MEANS	0	6	2	6	C	C+	C-		
ADMITTED TO COLLEGES OF EDUCATION											
10	GMR	P.E.	0	7	4	7	C+	B	D	Fluent speech, very pleasant.	Cert. Ed., B.Ed.
11	GMR	P.E.	0	8	3	8	C+	D	C+	Dull and uninteresting manner.	Cert. Ed., B.Ed.
12	GMR	P.E.	0	5	3	8	D	C+	B	Limited academic qualifications.	Cert. Ed., B.Ed.
13	S.MOD	P.E.	0	6	3	7	C	C-	C	Well balanced personality.	Cert. Ed., B.Ed.
14	S.MOD	P.E.	0	5	3	5	C	B	D	Self confident, good appearance.	Cert. Ed., B.Ed.
15	GMR	P.E.	0	9	2	10	C	B-	D	Forthright, well spoken.	Cert. Ed., B.Ed.
16	TECH	P.E.	0	6	2	6	C+	C+	D	Quiet and reserved.	Cert. Ed., B.Ed.
17	GMR	P.E.	0	6	1	7	C	B	D	Fairly thoughtful, good appearance.	Cert. Ed., B.Ed.
18	S.MOD	P.E.	0	6	1	7	C+	C	B-	Slightly immature.	Cert. Ed., B.Ed.
19	GMR	P.E.	0	5	1	5	C+	B-	C-	Minimum requirements only.	Cert. Ed., B.Ed.
		MEANS	0	6	2	7	C	C+	C-		

Details of the physical education students rejected by College I.

(n = 95).

APPLICANT No.	TYPE of SCHOOL ATTENDED	MAIN SUBJECT	G.C.E. RESULTS BEFORE / AFTER INTERVIEW				INTERVIEW GRADES			INTERVIEW COMMENTS	EVENTUAL CAREER.
			'A' LEVEL.		'O' LEVEL.		ACAD-EMIC	PERSON-ALITY	PRACT-ICAL.		
ADMITTED TO COLLEGES OF EDUCATION.											
20	GMR	P.E.	0	8	3	8	B-	C	D	Doubt if he has strength of personality.	Cert. Ed.
21	GMR	P.E.	0	8	3	8	C+	C	C	Speech poor.	Cert. Ed.
22	GMR	P.E.	0	7	3	7	C+	C-	C	Weak in expression.	Cert. Ed.
23	PUB.	P.E.	0	7	3	7	B-	C	D	Not straightforward. Well spoken.	Cert. Ed.
24	S.MOD	P.E.	0	8	2	9	C+	C+	C	Poor speech, good presence.	Cert. Ed.
25	GMR	P.E.	0	8	2	9	C	C-	D	Dull, Speech Poor.	Cert. Ed.
26	GMR	P.E.	0	8	2	8	C+	B-	C-	Confident, thinks clearly.	Cert. Ed. (3 distinctions).
27	S.MOD	P.E.	0	7	2	9	C-	C-	C	Communication difficult.	Cert. Ed. (3 credits).
28	GMR	P.E.	0	7	2	8	C+	B	D	Interested in his work.	Cert. Ed.
29	GMR	P.E.	0	7	2	8	B	C+	D	Fluent speaker, overweight.	Cert. Ed.
30	GMR	P.E.	0	7	2	7	C+	C+	D-	Talkative but inappropriately dressed.	Cert. Ed.
31	GMR	P.E.	0	7	2	7	C+	C-	B-	Difficulty in communicating.	Cert. Ed.
32	S.MOD	P.E.	0	7	2	7	C+	C+	D	Pleasant attitude, speech good.	Cert. Ed.
33	GMR	P.E.	0	7	2	7	C-	C	D	Uncritical, immature.	Cert. Ed.
34	GMR	P.E.	0	5	2	7	C+	C+	C-	Reasonable background.	Cert. Ed.
35	COMP	P.E.	0	6	2	6	C	B-	D	Does not enjoy study.	Cert. Ed.
36	GMR	P.E.	0	5	2	6	C-	C-	C-	Nervous.	Cert. Ed.
37	S.MOD	P.E.	0	5	2	6	D	D	C	Does not read much.	Cert. Ed.
38	GMR	P.E.	0	6	2	6	C+	B-	C	-	Cert. Ed. (1 distinction).
39	COMP	P.E.	0	5	2	5	C	C-	C+	Interests could be widened.	Cert. Ed.
40	GMR	P.E.	0	9	1	9	C	E	C	Serious speech defect.	Cert. Ed.
41	GMR	P.E.	0	9	1	9	C	D	C-	Query motivation.	Cert. Ed.
42	COMP	P.E.	0	9	1	9	C+	C+	B	Nervous.	Cert. Ed.
43	GMR	P.E.	0	6	1	9	C	C-	C	No intellectual sparkle.	Cert. Ed.
44	GMR	P.E.	0	6	1	9	C	C	C	Not very fluent.	Cert. Ed.
45	GMR	P.E.	0	7	1	8	C	C	B-	Pleasant but reserved.	Cert. Ed.
46	GMR	P.E.	0	7	1	8	C-	D	C	Dull personality.	Cert. Ed.
47	GMR	P.E.	0	8	1	8	C-	D	C-	Poor expression.	Cert. Ed.
48	COMP	P.E.	0	7	1	8	C	C+	B-	-	Cert. Ed.
49	COMP	P.E.	0	7	1	8	C	C	B	Poor academically.	Cert. Ed.
50	GMR	P.E.	0	5	1	8	C-	C-	C	Lacks vitality.	Cert. Ed.
51	GMR	P.E.	0	7	1	7	C	D	D	Not sociable.	Cert. Ed.
52	S.MOD	P.E.	0	6	1	7	C-	C	C+	Spelling weak.	Cert. Ed. (Class II).
53	TECH	P.E.	0	6	1	6	C-	C-	C	Communication difficult. Gauche.	Cert. Ed.
54	TECH	P.E.	0	6	1	6	C+	C	C	Regional accent.	Cert. Ed.
55	TECH	P.E.	0	6	1	6	C-	C-	C-	Weak. A pro' footballer.	Cert. Ed.
56	GMR	P.E.	0	6	1	6	C-	E	C	Honesty suspect.	Cert. Ed.
57	GMR	P.E.	0	6	1	6	C	C-	D	Poor academic background.	Cert. Ed.
58	S.MOD	P.E.	0	6	1	6	C+	C+	D+	Not many ideas.	Cert. Ed.
59	COMP	P.E.	0	5	1	6	D	D	B	Very poor speech.	Cert. Ed.
60	GMR	P.E.	0	5	1	5	C	C+	D	Well motivated.	Cert. Ed.
61	GMR	P.E.	0	9	0	9	C+	C	D	Withdrawn and inarticulate.	Cert. Ed.
62	S.MOD	P.E.	0	8	0	8	C+	C-	D+	Diffident, lacks confidence.	Cert. Ed.
63	S.MOD	P.E.	0	7	0	8	C-	C+	C	A Sec. Mod. boy.	Cert. Ed. (3 merits).
64	GMR	P.E.	0	6	0	8	C	C+	D	Sport mad. Well motivated.	Cert. Ed.
65	COMP	P.E.	0	7	0	7	B-	C	C	Defective eyesight.	

APPENDIX I (A) Cont'd.

APPLICANT No.	TYPE of SCHOOL ATTENDED	MAIN SUBJECT	G.C.E. RESULTS BEFORE / AFTER INTERVIEW 'A' LEVEL.		'O' LEVEL.		INTERVIEW GRADES ACADEMIC	PERSONALITY	PRACTICAL.	INTERVIEW COMMENTS	EVENTUAL CAREER.
ADMITTED TO COLLEGES OF EDUCATION.											
66	GMR	P.E.	0	7	0	7	C	D+	D	Speech poor. Immature.	Cert. Ed.
67	GMR	P.E.	0	7	0	7	C-	C	C	Pleasant personality. Talks Well.	Cert. Ed.
68	COMP	P.E.	0	6	0	7	C	C+	D+	Nervous, but with definite opinions.	Cert. Ed.
69	PUB	P.E.	0	6	0	7	C-	B-	C	Hopes to become a minister.	Cert. Ed. (3 merits).
70	GMR	P.E.	0	6	0	6	C+	C-	C-	Diffident.	Cert. Ed.
71	GMR	P.E.	0	6	0	6	C	C+	E	Limited. Stolid.	Cert. Ed.
72	S.MOD	P.E.	0	6	0	6	C-	C+	C	Inferiority complex. Limited vision.	Cert. Ed.
73	GMR	P.E.	0	6	0	6	C-	C-	D	Modest achievements.	Cert. Ed.
74	TECH	P.E.	0	6	0	6	D+	D+	C-	Hesitant in speech.	Cert. Ed.
75	GMR	P.E.	0	5	0	6	C-	C-	D	Modest achievements.	Cert. Ed.
76	COMP	P.E.	0	5	0	5	D	C+	C	Pleasant but limited.	Cert. Ed.
77	TECH	P.E.	0	5	0	5	D	C	C	Shy. On the slow side.	Cert. Ed.
78	GMR	P.E.	0	5	0	5	C-	C-	C	Nice lad, not sure of himself.	Cert. Ed.
79	S.MOD	P.E.	0	5	0	5	C	C+	C	Rather limited in discussion.	Cert. Ed.
		MEANS	0	6	1	7	C	C	C-		
ENTERED PROFESSIONS. (including part-time education).											
80	S.MOD	P.E.	3	8	3	8	B	C	C	I doubt his motives.	Computer science.
81	GMR	P.E.	0	8	3	8	B-	B	D	Confident, well spoken.	Accountancy.
82	GMR	P.E.	3	7	3	7	C	C-	D+	Mixed record, poor speech.	Computer science.
83	GMR	P.E.	3	5	3	5	C	C+	C	Fair measure of success.	Engineering.
84	GMR	P.E.	0	7	2	9	C-	C-	D	Did not look us straight in the eye.	Meteorology.
85	GMR	P.E.	0	7	2	8	C-	D	D	Dull in manner.	Banking.
86	GMR	P.E.	0	7	2	7	C	C+	C	Pleasant, good appearance.	Accountancy.
87	S.MOD	P.E.	0	6	2	6	C	C	C	Finds school work difficult.	Civil Service.
88	GMR	P.E.	0	8	1	8	C-	D	C	Teaching is his second choice.	H.M.Forces Commission.
		MEANS	1	7	2	7	C	C	C-		
OTHERS.											
89	COMP	P.E.	1	5	1	6	C-	C-	C+	Only modest success. Pleasant.	Insurance.
90	GMR	P.E.	0	8	0	8	C+	C+	C	Seems determined, talks well.	Police.
91	GMR	P.E.	0	6	0	7	C	C	C+	Rough in speech and manner.	Plumber.
92	GMR	P.E.	0	5	0	6	C-	D	C+	Not a very impressive person.	Police.
93	S.MOD	P.E.	0	5	0	6	C	C	C	Limited in interests.	Industry.
94	S.MOD	P.E.	0	5	0	5	C-	C	C	Very limited, speech poor.	Clerical.
95	GMR	P.E.	0	5	0	5	D	D	C	Thin academically. Nervous.	Police.
		MEANS	0	5	0	6	C-	C-	C		

APPENDIX I (B).

Details of the academic students rejected by College I.

(n = 84).

APPLICANT No.	TYPE of SCHOOL ATTENDED	MAIN SUBJECT	G.C.E. RESULTS BEFORE / AFTER INTERVIEW				INTERVIEW GRADES			INTERVIEW COMMENTS	EVENTUAL CAREER.
			'A' LEVEL.		'O' LEVEL.		ACADEMIC	PERSONALITY	PRACTICAL.		
ADMITTED TO UNIVERSITIES.											
1	GMR	BIOL	0	9	5	9	C	C		Dressed casually, uncertain attitude.	B.Sc. Now lecturing.
2	S.MOD	BIOL	0	4	2	7	D	C-		Very mediocre. Monotonous.	Honours degree.
3	GMR	CHEM	0	9	4	9	C	D		Personality needs development.	B.Sc. (Hons). Ongoing Ph.D.
4	GMR	ENGL	2	7	2	7	C-	D		Nervous. Little to say.	B.A. Dip. Ed. ongoing.
5	GMR	GEOG	0	7	3	7	C+	B		Poor in examinations.	B.Sc. II i. Geologist.
6	GMR	GEOG	0	7	2	7	D	D		Lethargic, not very fluent.	B.Sc. (Hons).
7	GMR	GEOG	3	9	3	9	C-	E		Uncritical, lacking in perception.	B.A. II i.
8	GMR	HIST	2	5	3	5	C+	D		Reserved, lacking in liveliness.	B.A. ongoing.
9	GMR	HIST	0	7	3	7	B-	D		Indistinct speech.	B.Sc. 2 ii. Dip. Ed.
10	TECH	MATH	3	8	5	10	C+	D		Communication difficult.	B.Sc. ongoing.
11	GMR	PHYS	2	7	2	7	B	C-		Slow responses.	B.Tech. Industry.
		MEANS	1	7	3	8	C	D+			
ADMITTED TO POLYTECHNICS.											
12	S.MOD	ART	1	6	2	7	D	C-		Limited ability. Mature.	Ongoing diploma course.
13	GMR	ART	0	5	2	6	C+	C-		Dull in attitude.	Ongoing diploma course.
14	GMR	BIOL	0	5	3	5	C-	C-		Poor academically. Fluent.	Ongoing technology course.
15	GMR	CHEM	2	7	2	8	B-	E		A poor voice.	Higher National. L.R.I.C.
16	GMR	ENGL	0	6	1	6	C-	C		Little evidence of deep study.	Ongoing course.
17	GMR	GEOG	0	7	3	9	C-	C-		Lacks vitality.	B.Sc. II. Industry.
18	S.MOD	GEOG	1	6	1	8	C-	C-		Dull.	Diploma course.
19	GMR	H/C	0	5	3	5	C-	D+		Not very lively or impressive.	Ongoing engineering degree.
20	COMP	HIST	1	6	3	7	D	D		Limited, aimless youth.	Law degree.
21	GMR	MATHS	3	8	3	8	B-	D		Not strongly motivated.	Computer Science.
		MEANS	1	6	2	7	C-	D+			
ADMITTED TO COLLEGES OF EDUCATION.											
22	S.MOD	ENGL	0	7	2	7	C	C-		Rigid in attitude.	Cert. Ed. B. Ed.
23	COMP	ENGL	0	5	3	6	C-	C-		Nervous, limited.	Cert. Ed. B. Ed.
24	GMR	ENGL	0	9	3	10	D	C-		Limited background.	Cert. Ed. B. Ed.
25	GMR	FREN	2	7	3	7	C-	C-		Limited in insight.	Cert. Ed. B. Ed.
26	GMR	MATHS	0	5	2	5	C	C		Academically on the borderline.	Cert. Ed. Ongoing B.Ed.
27	GMR	MUS	1	7	1	7	D	C+		Lacks training in this subject.	Cert. Ed. B. Ed.
28	GMR	R.K.	0	5	1	6	C-	C-		Will have difficulty with children.	Cert. Ed. B. Ed.
		MEANS	0	7	2	7	C-	C-			

APPENDIX I (B) Cont'd.

APPLICANT No.	TYPE of SCHOOL ATTENDED	MAIN SUBJECT	G.C.E. RESULTS BEFORE / AFTER INTERVIEW				INTERVIEW GRADES			INTERVIEW COMMENTS	EVENTUAL CAREER.
			'A' LEVEL.		'O' LEVEL.		ACAD-EMIC	PERSON-ALITY	PRACT-ICAL.		
ADMITTED TO	COLLEGES OF	EDUCATION.									
29	COMP	ART	1	6	2	8	C-	C-		Uncertain vocal quality.	Cert. Ed. (2 credits).
30	S.MOD	ART	0	7	2	7	D	D		Restricted and immature.	Cert. Ed.
31	GMR	ART	2	5	2	6	D	D+		Not up to standard. Ineffectual.	Cert. Ed.
32	GMR	ART	0	6	1	9	D	D		Little drive.	Cert. Ed.
33	GMR	ART	0	5	1	7	C	C-		Shallow.	Cert. Ed.
34	TECH	ART	0	7	0	7	C-	C		Pleasant, lacks originality.	Cert. Ed.
35	S.MOD	BIOL	0	7	1	8	C-	C		Poorly informed.	Cert. Ed.
36	GMR	BIOL	0	7	1	7	C-	C		A little casual.	Cert. Ed.
37	COMP	BIOL	0	7	0	7	D	D		Imprecise and confused.	Cert. Ed.
38	GMR	BIOL	0	7	0	7	D	C-		Low potential.	Cert. Ed.
39	TECH	BIOL	0	6	0	6	C	C-		Pleasant, limited.	Cert. Ed.
40	COMP	BIOL	0	6	0	6	C-	C-		Below standard.	Cert. Ed.
41	GMR	CHEM	0	9	2	9	C-	D		Slow reactions.	Cert. Ed.
42	GMR	CHEM	0	8	2	8	C-	C-		Shy, hesitant speech.	Cert. Ed. (1 Distinction 1 Merit)
43	GMR	CHEM	0	6	1	6	C-	C-		Immature, no experience.	Cert. Ed.
44	COMP	CHEM	0	5	1	5	D	D		Unimpressive personality.	Cert. Ed.
45	GMR	ENGL	0	8	1	8	C	C		Fairly open and pleasant.	Cert. Ed.
46	GMR	ENGL	0	6	1	6	C-	C-		Slow of speed, sincere.	Cert. Ed.
47	GMR	FREN	0	8	2	8	C	C		Could be a source of trouble.	Cert. Ed.
48	S.MOD	GEOG	0	7	2	8	C-	C-		Little superficial, not fluent.	Cert. Ed. (distinction).
49	S.MOD	GEOG	0	6	2	8	C-	C-		Little sense of humour.	Cert. Ed.
50	S.MOD	GEOG	0	7	2	7	C	C+		Pleasant but slow - juniors?	Cert. Ed.
51	GMR	GEOG	0	6	1	7	D	D+		No concept of role of teacher.	Cert. Ed.
52	COMP	GEOG	0	7	0	8	D	C-		Pleasant, nervous, not yet ready.	Cert. Ed.
53	S.MOD	GEOG	0	6	2	6	C-	C-		Honest but no enthusiasm.	Cert. Ed.
54	GMR	H/CRF	0	8	3	8	C	D		Quiet, not impressive.	Cert. Ed.
55	GMR	H/CRF	0	6	2	6	C	D		Speech difficulty.	Cert. Ed.
56	TECH	H/CRF	0	5	2	5	C-	D		Careless speech.	Cert. Ed.
57	GMR	H/CRF	0	8	1	9	C	C-		Nervous, finds English difficult.	Cert. Ed.
58	COMP	H/CRF	0	5	0	8	C-	C+		Nervous, talks well.	Cert. Ed.
59	COMP	H/CRF	0	5	0	5	D	D		Low standards, low vitality.	Cert. Ed.
60	S.MOD	HIST	0	8	3	8	D	D		Inarticulate - nervousness?	Cert. Ed.
61	TECH	HIST	0	5	2	7	C-	C		Pleasant, communication limited.	Cert. Ed.
62	GMR	HIST	0	5	2	6	D	C-		Unable to discuss anything.	Cert. Ed.
63	GMR	HIST	0	6	0	7	C+	C-		Question analysis.	Cert. Ed.
64	S.MOD	MATHS	0	5	0	8	C	C		Lacks confidence.	Cert. Ed.
65	GMR	PHYS	0	7	1	9	C+	D		Poor head's report.	Cert. Ed.
66	GMR	PHYS	0	6	0	6	D.	D		Uncritical, unobservant.	Cert. Ed.
67	COMP	R.K.	0	4	2	4	D	D		Sincere in his desire to teach.	Cert. Ed.
		MEANS.	0	7	1	7	C-	C-			

APPENDIX I (B) Cont'd.

APPLICANT No.	TYPE of SCHOOL ATTENDED	MAIN SUBJECT	G.C.E. RESULTS BEFORE / AFTER INTERVIEW 'A' LEVEL.		'O' LEVEL.		INTERVIEW GRADES ACADEMIC	PERSONALITY	PRACTICAL.	INTERVIEW COMMENTS	EVENTUAL CAREER.
ENTERED PROFESSIONS. (including part-time education).											
68	COMP	CHEM	0	7	3	9	D	D		Dull and shy.	Accountancy.
69	PUB	ENG	2	7	2	8	D	C-		Something of an anarchist.	Estate Management.
70	GMR	ENG	0	6	4	6	E	E		No enthusiasm.	Computer science.
71	S.MOD	ENG	2	4	2	6	E	E		No apparent potential.	Banking.
72	TECH	GEOG	0	6	0	7	C-	C-		Not an attractive personality.	Accountancy.
73	GMR	GEOG	0	6	2	7	C-	C-		Weak, slow in speech.	Quantity Surveying.
74	GMR	GEOG	0	7	0	7	C-	D+		Colourless personality.	Banking.
75	S.MOD	GEOG	0	5	1	6	C-	C-		Limited personal resources.	Civil Service.
76	COMP	H/C	0	4	3	6	D	D		Likeable, speech not very good.	Civil Service.
77	GMR	MATHS	0	6	2	6	C-	C		Poor motivation.	Banking.
78	COMP	PHYS	0	5	0	5	C-	C		Not very strong.	Computers.
79	GMR	R.K.	0	5	0	5	E	D		Quiet, rather gauche.	Civil Service.
		MEANS	0	6	2	7	D+	D+			
OTHERS.											
80	GMR	BIOL	0	7	1	6	C-	D		Very little personality.	Lab. technician.
81	GMR	CHEM	0	6	2	6	C	C-		A chequered career.	Police.
82	GMR	FREN	0	6	1	7	C-	C		Will find course hard.	Export.
83	COMP	FREN	0	5	0	5	C-	B-		Poor academically.	Clerical.
84	GMR	RUR.S.	0	6	0	7	C-	D+		Not very observant.	Sales rep.
		MEANS	0	6	1	6	C-	C-			

MAIN SUBJECT KEY: ART - ART & CRAFT; BIOL - BIOLOGY; CHEM - CHEMISTRY; ENG - ENGLISH; FREN - FRENCH; GEOG - GEOGRAPHY; H/C - HANDICRAFTS; HIST - HISTORY; MATHS - MATHEMATICS; MUS - MUSIC; R.K. - RELIGIOUS KNOWLEDGE; RUR.S - RURAL SCIENCE; PHYS - PHYSICS:

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