I N T R O D U C T I O N

Forecasting of performance of the teacher trainees is a problem of obvious importance in education. Although it is performance as a teacher which really matters yet achievement during training may nevertheless be viewed as a proximate criterion to measure the later success. Competent opinions of Cattell (1931), Pinset (1933), Collins (1959), and Walter (1957) also indicate that the qualities demanded of a young teacher to leave college do not differ essentially from those expected of a good, mature teacher and that the teaching capacity based on the grades achieved in the professional years do serve as a guide to future teaching. Tudhope (1942) in his study has also endorsed the same point of view. Yaukey and Anderson (1950) report a median correlation of .26 between scores on professional tests and teaching success in the field. Similarly, Sandiford (1950) reports a median correlation of .23 with a range of .06 to .70 between marks earned in the practice of teaching and measures of teaching success after entering the profession.

In view of the importance of the teachers training period, the problem of selection of teacher trainees thus assumes great significance. In our country the selection of teacher trainees is based on pre-training
Scholastic achievements, i.e. marks in the Matriculation and B.A./B.Sc. examinations and ratings made by the interviewers at the time of admission to the training course. The weightage given to marks in the said examinations and the interview is generally arbitrary. There is a general agreement that this procedure is not satisfactory. Moreover, studies by Burroughs (1951), Burroughs (1958), Scott (1968), Garside (1957), and staff of Central Bureau of Educational and Vocational Guidance, Delhi (1963), Crocker (1968), Merle (1968) have cautioned about the limitations of the interview technique in the selection of students for teacher training. Kelly (1957 a, b) concluded that the interview as a selection procedure was almost entirely lacking in validity. In his study at Michigan he found that the median correlation between the interviewer and the criteria of academic success was only .05. Gough, Hall and Harris (1963) also found a median coefficient of +.05 between interviewers ratings and the over-all grade point average in 14 medical school classes at the University of California, Sanfransisco. Some investigators, namely, Maccoby and Maccoby (1954), Sheatsley (1951) and Kahn and Cannell (1957) have suggested improvement in the use of interview techniques as a tool for selection. It is, however, felt that even in a well conducted interview the drawbacks of the interview technique may be minimised but they can never be eliminated.

Apart from the interview, the pre-training
achievement has been considered as an important variable in the selection of teachers. A few earlier studies by Kelley (1914), Embree (1937), Ross and Hooks (1930), Haggerty (1941), Wright (1929), Wrigley (1955), McClelland (1942), Learned and Wood (1938), Townsend (1951) have reported the utility of school marks for predicting later achievement. More recent studies by Owens and Roaden (1966), Morman, Heywood and Rogers (1967), Herbert (1967), Stansbery (1965), Franklin (1968) have also demonstrated the utility of using the previous academic record as one of the variables for predicting the academic achievement and success of the teacher-trainees. In some studies the interview and early academic record have been used for selecting teacher-trainees. Reviewing such studies Crocker (1968) concluded that the interview plus school record are of low value as predictors of teaching ability.

In some of the other recent prediction studies the high school grade points have been used along with other standardised tests for predicting college success. Altus (1961), Campbell (1966), Morice (1963), Gonzales (1964), Allgood (1964), Lehtovaara and Lehtinen Garside (1957), Hohne (1955), and Sanders (1948), in studies of such type, found that high school marks, mental ability tests, and achievement tests contribute significantly in the prediction of academic success. Bloom (1967) holds that while the relation between intelligence or aptitude measurement tends to become lower at the secondary and higher educational level, the relation between previous and
later achievement tends to remain high and even become higher during the secondary and college level. It would, however, be rather risky to generalize that early academic achievement is a good predictor of later academic success. Indeed, there are many studies: Gough, Hall, Harris (1963), Wantman (1953), Wesman (1959), Richard and Taylor (1961), Kelly (1957 b), Hammond and Kern (1959) which suggest that early academic indices do not predict achievement in medical training very well.

Another set of researches show that the intelligence test scores with a single index of intelligence or indices of primary abilities and aptitudes are also good predictors of academic achievement. Bloom (1967) has pointed out that general intelligence is useful for predicting performance on a great range of intellectual and cognitive tasks. Coleman and Cureton (1954) report that the relationship between general index of intelligence and over-all performance on a battery of achievement tests approaches unity at the elementary school level. At college level, as reported by Crawford and Burnham (1946) the correlation between intelligence and academic achievement drops to .50. Similarly, studies by Burt (1921), Freeman (1942), Carter (1950), Stephens (1956), suggest that among many factors which influence academic achievement, intelligence contributes significantly to the variations in the academic achievement score. In all these studies the correlation between intelligence and academic achievement has been round about .50. In one study,
Burt (1939) found that in the case of chief branches of the school curriculum the variance attributed to the general factor was 27.9 per cent. The importance of general intelligence in the scholarship examination taken by 10 and 11 year-old children has also been shown by Ormiston (1939), Pinter (1945), and McClelland (1942) found that the correlation between intelligence and the academic achievement relationship at the higher secondary level ranges between .28 and .70. In the studies of Travers (1949), Harris (1940), Holland (1958) and Lindquist (1951) the range of correlations between intelligence and academic achievement was from .30 to .80. With college students as subjects, Rosenfield and Nemzek (1938), Keys (1940) and Billhartz and Huston (1941) found correlations ranging from .21 to .35 between general intelligence and college grades. Studies by Louttit (1947) and Cohler (1941), however, report that the intelligence tests even at the elementary school stage are not of adequate predictive value. Likewise the predictive validity of intelligence and aptitude tests has also been investigated at college level by Frederikse and Schrader (1952), Kennedy (1958), O'Neill (1959), Grater and Thalman (1955), Henderson and Mauleg (1959) Rowland (1959) and Lennon (1950). They report that the correlation between college success and general intelligence ranges between .20 and .67.

For finding a satisfactory answer to the problem of prediction of academic achievement, studies have also been
made by factor analysing the achievement test scores along with personality and intelligence test scores. In one such study, Burt (1917) established that a tendency for an even level of achievement is found in all school subjects, which according to him was due to the presence of a general factor (General educational factor) running through all the subjects. Likewise Lewis (1961) emphasised the role played by general intelligence and certain group factors in the performance of school subjects.

With Thurston's work on primary mental abilities, researchers became interested in differential prediction. In reviewing studies of primary mental abilities, Goodman (1946) found that the verbal ability test correlated better than any other primary mental ability test with semester point average and with individual college courses. The correlations, however, were generally low. Travers (1949) has aptly pointed out that "the relatively low values of the correlation between scholastic achievement and the primary mental abilities test suggest not that the factorial approach has little value but that the primary mental abilities test does not measure all the major factors that contribute to academic success". Butsch (1939) has suggested that by assigning differential weights to the components, prediction of success could be improved in the courses of Engineering, Journalism, Business Administration and Liberal Arts. But according to Super (1956), "The lessened predictive value of the multiple factor test is the price of versality". Anastasi (1961) while dealing with the Differential Aptitude Test (D.A.T.) also points out that the results are somewhat less encouraging with regard to
differential prediction.

Berdie (1959) in the fifth mental measurements year book while reviewing the Multiple Aptitude Tests of David Segel and Evelyn comments, "— Tests such as these perhaps cannot predict how successful men will be on a job, but rather can serve to differentiate among persons who enter in and are minimally successful in different occupations".

The low predictive value of early academic achievement, interview ratings, intelligence tests, especially at the college level, led various investigators to search for other sources of prediction particularly among non-intellectual variables. They argue that the personality of a teacher is a significant variable in the classroom. Research in this direction was initiated much earlier and the literature concerned has been reviewed by Barr (1948), Domas and Tiedman (1950) and Morsh and Wilder (1954). Some of the comparatively recent work in this area is by: Eron (1954), Funkenstein (1957), Holt and Luborsky (1958), Schofield (1953), Stuit (1941), Holland (1959), Keimowitz and Ansbacher (1960), Maxwell (1960), Gough and Hall (1964) Borrow (1946), Petrie (1948) Stagner (1933), Savage (1962) Linton (1967), Ryans (1938), Thorton (1941), Edmiston (1949), Ford (1957), Duff and Siegel (1960), Orson (1964), Cook (1964), Grangaard (1965), Metivier (1965). The purpose of all these studies was to explore the utility of non-intellectual variables in the prediction of success. In
reviewing some of the studies Gough and Hall (1964) remark that "the so called non-intellective domain is one in which current effort is being expanded, but even here the yield has not been impressive". Inspite of this the search for these additional predictors is in progress with a hope to enhance the predictive efficiency of selection batteries. Several research designs of such studies are critically reviewed by Thorndike (1963) in his monograph on the concept of over and under achievement. The most frequent design in the search for non-intellective predictors of college achievement involves correlating scores on each of the scales of a personality inventory with an index of college achievement, while holding a third variable constant through the use of partial correlation. Goodstein and Hailburn (1962) in using such a design argue that when heterogeneous ability groups are studied and levels of ability are ignored as a variable, the true relationship between personality factors and achievement may be concealed. Hakel (1966) however, in his cross validation study has questioned the stability and generality of Goodstein and Hailburn's result while using intellectual ability as a moderator on a sample stratified on levels of intellectual ability. Some investigators like Garrett (1949), Gowan (1960), Harris (1931), Harris (1940) in their attempt to formulate a comprehensive and integrated picture of personality factors contributing to academic achievement in schools and colleges have come to the conclusion that the replication studies have not established the uniformity or consistency of relationship. According to
Gowan (1960), "the problem appears more complex than was at first indicated and contradictory and unexpected findings have muddied the waters." Travers (1963) and Middleton and Guthrie (1959), Evans (1953), Oliver and Butcher (1962), Warburton and Hadley (1960), Soloman (1965), Lawton (1939), and Evans (1957) also point out that attempts to improve prediction by using non-intellectual factors, such as, interest, personality, attitude towards the teaching profession and biographical data have not yielded encouraging results. Indeed, the researchers concerned with prediction of success in teaching and the teachers training course are inconclusive.

In the recent studies the trend to combine intellectual and non-intellectual factors is quite visible. Hinkelman (1952), Whatley (1964), Kilpatrick (1965), Hughes (1963), Burns (1963), Standridge (1968), Rogers (1967) have suggested that we can improve prediction by tapping non-intellectual factors along with intellectuals. Irvine (1966) in his studies of multiple prediction of College graduation from pre-admission data also suggests that improved prediction of graduation might depend upon tapping of non-intellectual factors not included in his study.

**Indian Studies:**

Similar studies have also been conducted in India. Studies showing the relationship of school marks with
intelligence were undertaken by Bhargava (1957), Kapoor (1961), Parhi (1960), Parekh (1957), Richaria (1958), Sat Sangi (1960), Shivaramayya (1947), Singh (1957), Sirivastva (1955), Uppal (1965), and Kumari (1965). All except Sirivastva (1967) found the correlations to be significant. A few other studies: Choudhari (1963), Pairthraun (1963), Kaur (1961), Raghavacharyulu (1957), Gadgil and Danekar (1955), Chitkara (1961), Sinha (1966) demonstrated the relationship of age, sex, rural background and socio-economic status, and family background with achievement. Kaur and Bhatnagar obtained a low relationship between social status and achievement, whereas Raghavacharyulu and Pairthraun obtained a high correlation. An over-all view of the results of these studies reflects the trends found in other studies of a similar nature taken elsewhere. Following the same line of investigation Patel (1959), Sole (1954), Sharma (1959), Sen (1961) founded an insignificant relationship with health, participation in extra-curricular activities, physical efficiency and leisure time activities.

Studies on the relationship of aptitude, attitude and interest with academic achievement, undertaken by Datta (1952) and Dutta (1963) obtained a positive relationship, whereas Purandare (1961) showed a low correlation between attitude towards school subjects and achievement.

A comprehensive study to probe into the organisational and administrative factors affecting the
achievement of pupils in secondary schools was undertaken by the Education Department of Kerala University under Pillai's (1966) guidance. They have made a few useful suggestions.

After a careful review of literature in this area, Dave (1968) found that in India only a few studies are concerned with prediction of academic achievement at school or college level. He has further suggested that research is also needed to refine the tools for making academic prediction easier and precise. Sharma (1956) and Sharma (1961) demonstrated the possibility of prediction of achievement in the school final examination from performance in the house examination. Dutt (1955) recommended that the average school marks of three years be accepted as criteria for admission to the University, specially for borderline cases. Chatterji and Mukherjee (1966) recommend the use of some objective measures in addition to school marks for better prediction. Pandey (1963) showed the futility of internal assessment in predicting success in the first year of the engineering course. Joshi (1969), however, revealed significant correlation between internal and external awards.

Mehdi (1965) in his doctoral work investigated differential factors in pupils' success in Science, Art and Commerce courses at the Higher Secondary stage and demonstrated that there do exist differences both in kind and degree between the combinations of factors required for success in the three courses. His study brought out the
utility of using tests of verbal meanings, inductive reasoning and numerical faculty for predicting academic success. He, however, doubted the common assumption that science courses require a higher level of intelligence than the Arts and Commerce courses. Kamat, Deshmukh and Pandit (1966) in factor analysing marks obtained by 1200 students in the pre-degree examination of the Poona University showed general ability explaining 55% of the variance. Likewise, Dash (1959), Joshi (1966) and Tripathi (1962) emphasised the role played by general intelligence and certain group factors in the performance of school subjects. Rastogi (1965) suggests that prediction of achievement at a college level is improved on the basis of interest and intelligence test scores. Raina (1965) in an attempt to predict the success of teacher-trainees came to the conclusion that prediction can be improved if Matriculation marks are combined with intelligence. Narayan (1962) found the pre-university examination to be the best predictor for predicting at the college level. He suggested that a combination of Pre-university marks, 1st term marks, scores on Raven's Progressive Matrices Test score and the verbal test of mental ability is likely to increase the predictive efficiency.

Sinha (1966) while probing the role of factors associated with success and failure in University education reported that compared with high achievers the low achievers were significantly more dissatisfied with their examination results, they were apprehensive of failure in examination and they were irregular and unsystematic in their studies,
and were inferior in intelligence. Low achievers were observed to be more anxious, less well adjusted, more apathetic and despondent, less flexible, less original in expression and mostly came from the rural and poor home background. The studies of Deb (1958), Sharma and Kalra (1960) Sinha and Misra (1960) and Sinha (1960) have explored the role of sociological and psychological factors in the success of engineering students.

Studies by Kamat and Deshmukh (1963), Gadgil and Dandekar (1955), Chitkara (1961) and Deo (1967) highlight the factors which are responsible for academic achievement at the school and college level. They have suggested ways and means to eliminate wastage and stagnation at the high school and college level. Joshi and Sharma (1967) listed the non-intellectual variables associated with underachievement.

The studies reviewed in this chapter suggest that there are a large number of variables which are related with academic success at the school and college levels. It is also clear that the predictors found useful at one level are not equally so at other levels. Cultural variation also seems to play a very significant role. Thus, the inference drawn on the basis of these studies cannot be regarded as general. It becomes necessary, therefore, to tackle afresh the problems concerning the prediction of academic success as they face us.
In the present study an attempt is made to locate the set of intellectual and non-intellectual variables, which have significant relation with the performance in "Theory Papers" and "Teaching Skill" of the Post Graduate Teachers Trainees of Punjab.

The index of performance in "Theory Papers" is the percentage of marks earned by the teacher trainees in the "Theory" part of the B.Ed. examination conducted centrally by the University, evaluated externally by the sub-examiners, and reviewed by the head examiners or paper-setters nominated by the University.

The index of performance in "Teaching Skill" is the percentage of marks given to the teacher-trainees by the two examiners after observing their performance in two teaching lessons arranged for the purpose.

The intellectual performance is the one in which superiority depends primarily on the use of higher processes such as abstract thinking, memory, reasoning, etc. The distinctive feature of a test of intellectual ability is that the subject is encouraged to achieve the best score he can. The main objective is to discover how well the individual can perform in certain areas under the most favourable conditions which can be provided. Every effort is made in such tests to control motivation, interest, surrounding conditions, and other contributing factors in such a way as to ensure that the individual is doing his best at the test.
The variables of this type included in the present study are: two tests of intelligence (Ravens Progressive Matrices Test and the test of factor B of Cattell's 16 P.F) and two tests of early academic achievement denoted by the percentage of marks in the Matriculation and B.A./B.Sc. examinations.

Non-intellectual activity is the one in which the superiority of the individual's performance depends upon his habitual mode of reacting to a given situation. The type of tests conventionally placed in this category include measures of personality traits, character traits, motivation, interests, and attitudes.

The non-intellectual variables included in the reported study are measures of personality factors and traits - 18, dominant interests - 6, attitude towards teaching profession - 1.

The first stage of investigation is exploratory in nature, using intellectual and non-intellectual variables. The results thus obtained were used to develop the regression equation to predict the performance of the teacher-trainees to be selected subsequently. In the second phase, two prediction studies were conducted -- one for boys (N = 59) and one for girls (N = 68). The results are reported in Part II of the report.

At the third stage a factor analytical study was made with the hope of finding the factorial structure of the intellectual and non-intellectual abilities of the teacher-trainees.