

CHAPTER III

METHODOLOGY

3.1. Introduction

In order to achieve the objective of the present study, which have already been detailed in Chapter I, it is necessary to look at certain methodological requirements which would help to arrive at some reliable and valid conclusions. In fact, the methodology is an aid to fulfil the objectives of the study in a scientific, applicable and valid manner. The sample size for the study, the variables included, the procedure adopted for data collection and tabulation, and proper application of statistical techniques, generally, form the methodological base for any scientific investigation.

In a study of experimental nature, the aforesaid methodological requirements can be met by advance planning and designing of that study. Certain external factors, which may affect the results, are controlled before-hand. But in a study like the present one, which attempts to study the Dip. in Education actual entrance test results obtained in the real condition, it is not possible to control the external factors in advance. For this purpose, it is necessary to find some scientific way out to control or minimize the effect of the external variables. This can be done by studying the operational systems adopted for conducting the examination

and the procedure adopted at the time of marking answer - scripts. These operational systems will help to a great extent. In case of the present investigation, the researcher belongs to the same college and being staff member in the college was involved in the process of selecting the students for the Dip. in Education course. Therefore, is fully aware of these operational systems. This knowledge has been utilised wherever required for conducting the present study. The details of it would be given at appropriate places like selecting the sample and discussing the process of analysis. Prior to that, other common methodological aspects, viz., the sample, the variables, and the procedure of data collection and interpretation are mentioned separately as follows:

3.2. The Sample

3.2.1. The Sample for Objective 1 :

Objective 1 : To study the effectiveness of entrance test consisting of the following tests, viz.,

- i. General Ability Test composed of five subtests, namely;
 - a) Thai,
 - b) English,
 - c) Mathematics,
 - d) Science, and
 - e) Social Studies,

- ii. Major Subject Test,
- iii. Teachers' Personality Test and
- iv. Occupational Interests Test to predict the performance of teacher trainees at the Dip. in Education.

The sample were the students appeared and who had been selected and admitted for the Dip. in Education course of various major subjects at Surin Teachers College in the year 1980. The total number of students admitted to the course in the year 1980-81 was 674. From this total, 183 students were eliminated. Out of these 183 students, 67 did not appear in all the examinations in the Dip. in Education and 116 students were admitted to the course due to some influence (like relative of the staff members, member of Parliament etc.). This was done for making the investigation more scientific and precise. Thus, the sample selected to achieve the objective of the study was 491 students selected purely on the basis of merit of the entrance examination and remained present in all the examinations conducted during the course. These students were from various major subjects which were finally selected for the study. The exact number of students in each major subject is shown in the Table 3.2.1.

Table 3.2.1 : Number of the Students from Various Major Subjects Selected for Objective 1

Major Subjects	Number of the Students
Music	26
Library Science	41
Thai	42
English	33
Arts	42
Social Studies	34
Dramatics	34
Science	35
Mathematics	33
Agriculture	44
Home Economics	42
Health Education	42
Physical Education	43
Industrial Arts	-
TOTAL:	491

3.2.2. The Sample for Objective 2 :

Objective 2 : To study the factors underlying the entrance test, a sample of 3,000 students was drawn from various major subjects who had appeared in the entrance Test.

Out of these 3,000 students 1,000 students were selected for each year, viz., 1980, 1981 and 1982 in order to study the factors for the each year separately. The sample was selected by employing the stratified random sampling technique and this sample is shown in Table 3.2.2.

Table 3.2.2 : Number of the Sampled Students from Various Major Subjects for Objective 2

Major Subjects	Number of the students for the year			Total
	1980	1981	1982	
Music	16	15	19	50
Library Science	71	68	47	186
Thai	113	91	42	246
English	67	41	38	146
Arts	31	36	28	95
Social Studies	140	123	64	327
Dramatics	45	28	24	97
Science	71	58	43	172
Mathematics	58	43	31	132
Agriculture	111	140	131	382
Home Economics	99	103	65	267
Health Education	88	106	74	268
Physical Education	90	76	38	204
Industrial Arts	-	72	56	128
Primary Education	-	-	223	223
Development of the community	-	-	77	77
TOTAL:	1,000	1,000	1,000	3,000

3.3. The Variables

3.3.1. The Variables for Objective 1 :

Objective 1 : To study the effectiveness of entrance test consisting of the following tests, viz.,

- i. General Ability Test composed of five subtests, namely;
 - a) Thai;
 - b) English;
 - c) Mathematics;
 - d) science and
 - e) Social Studies,
- ii. Major Subject Test,
- iii. Teachers' Personality Test and
- iv. Occupational Interests Test to predict the performance of teacher trainees in the Dip. in Education.

The marks obtained by the students in various tests of entrance test and at the Dip. in education course are considered here as variables.

At the entrance test, the marks for different tests, viz.,

- i. Total of General Ability Tests,

- ii. Major Subject Test,
- iii. Teachers' Personality Test,
- iv. Occupational Interests Test and
- v. Grand Total of Entrance Tests.

At the Dip. in Education course, the marks for different courses, namely;

- i. Total of Foundation Courses;
- ii. Ed.111 : Foundation of Education;
- iii. Ed.121 : Psychology of Development;
- iv. Ed.122 : Psychology of Education;
- v. Ed.131 : Principles of Teaching and Preparing
Field Experience;
- vi. Ed.181 : Hygiene Plan in School;
- vii. Ed.231 : Methods of Teaching Skill;
- viii. Ed.232 : Methods of Teaching Life Experience;
- ix. Ed.251 : Measurement and Evaluation in Education;
- x. Total of Education Courses;
- xi. Grade Point Average of Major Subject;
- xii. Teaching Practice and
- xiii. Total Grade Point Average : GPA were considered as
variables.

Thus, the variables finally considered for the present study were the marks from entrance test and different courses in Dip. in Education examination.

The same are mentioned as follows:

A : Entrance Test Marks:

- i. Total of General Ability Tests
- ii. Major Subject Test
- iii. Teachers' Personality Test
- iv. Occupational Interests Test
- v. Grand Total of Entrance Tests

B : The Dip. in Education Marks:

- i. Total of Foundation Courses composed of the following courses:
 - a) Thai 101
 - b) Thai 102
 - c) Library 101
 - d) Politics 101
 - e) Mathematics 101
 - f) Science 101
 - g) Science 102
 - h) Physical Education 101
 - i) Health Education 101
- ii. Education Courses:
 - a) Ed.111 : Foundation Education
 - b) Ed.121 : Psychology of Development
 - c) Ed.122 : Psychology of Education

- d) Ed. 131 : Principles of Teaching and Preparing
Field Experience
 - e) Ed. 181 : Hygiene Plan in School
 - f) Ed. 231 : Methods of Teaching Skill
 - g) Ed. 232 : Methods of Teaching Life Experience
 - h) Ed. 251 : Measurement and Evaluation in Education
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- iii. Total of Education Courses
 - iv. Grade Point Average of Major Subject
 - v. Teaching Practice
 - vi. Total Grade Point Average: GPA

The marks assigned in the above mentioned tests/courses were raw scores except Major Subject converted into percent, Grade Point Average of Major Subject and Total Grade Point Average: GPA selected in the present study.

3.3.2. The Variables for Objective 2 :

Objective 2 : To study the factors underlying the entrance test.

The following marks obtained by the students of each entrance test are considered here as variables. In the year 1980, entrance test composed of the different subtests, viz.,

- i. Thai,
- ii. English,

- iii. Mathematics,
- iv. Science,
- v. Social Studies,
- vi. Teachers' Personality Test and
- vii. Occupational Interests Test

whereas, in the year 1981-82 the entrance test consisted of subtests, namely ;

- i. Thai;
- ii. English;
- iii. Mathematics;
- iv. Science and
- v. Social Studies.

The same are mentioned as follows:

A : Entrance Test Marks in the Year 1980:

- i. Thai
- ii. English
- iii. Mathematics
- iv. Science
- v. Social Studies
- vi. Teachers' Personality Test
- vii. Occupational Interests Test

B : Entrance Test Marks in the Year 1981-82:

- i. Thai
- ii. English
- iii. Mathematics
- iv. Science
- v. Social Studies

The marks assigned in the above mentioned tests were raw scores for each of the year separately which have been taken for the purpose of this study.

3.4. The Collection of Data

It is a general practice that when the result of each examination has been declared, all the related documents must be kept confidentially, it is difficult to lay hands directly on the examination results. Regarding this study, the investigator took sanction from the director of Surin Teachers College to collect the relevant information.

Since the data analysed in the present study is based on the achievement of students in the entrance test and Dip. in Education course, the investigator collected the scores of students related to both. As the investigator was required to collect these scores and tally them against serial numbers, seat numbers and roll numbers, it is felt that a brief description of data collection should be made

as an explanation for its reliability. It is as follows:

In order to achieve the first objective, i.e. to study the effectiveness of entrance test consisting of the following tests, viz;

- i. General Ability Test; composed of five subtests, namely,
 - a) Thai,
 - b) English,
 - c) Mathematics,
 - d) Science and
 - e) Social Studies;
- ii. Major Subject Test;
- iii. Teachers' Personality Test and
- iv. Occupational Interests Test

to predict the performance of teacher trainees in Dip. in Education, the marks at the entrance test in the year 1980 were collected by the investigator personally. There was a list of the names of candidates who were selected for the course. The seat numbers of these candidates were found out by tallying them against the names of the candidates and they were again confirmed against the serial numbers which were given to them at the time of accepting their applications for entrance test. In the registrar's office only T scores

were available for different tests. Therefore, investigator collected T scores in different major subjects selected by the students separately. T scores in different General Ability subtests, Teachers' Personality Test and Occupational Interests Test were also collected. These T score which were obtained by the investigator were converted into raw scores. It may be mentioned here that the total of various major subjects offered by the candidates was different. Therefore, these raw score were converted into percentages to bring them on a common scale.

The Total of General Ability Tests was arrived at by summing up the raw scores in different General Ability subtests and the Grand Total of Entrance Tests was obtained by summing up the scores of all the tests included in the entrance test.

At the Dip. in Education course, the investigator could collect directly the marks of different courses from the registrar's office except Grade Point Average of each Major subject and Total Grade Point Average : GPA, these were calculated according to each of Major subject and the courses to be selected in the present study.

For achieving the second objective, that is to find out the factors underlying the entrance test, the

scores of the candidates in different entrance tests were obtained. It may be noted, that, in the year 1980 only the T scores were available which were converted into raw scores as indicated earlier. But for the year 1981 and 1982 the raw scores were available. For this purpose, the investigator was provided the answer scripts of the entrance test by the registrar's office. From these answer scripts, the answer scripts of those candidates who were selected for the present study were separated out. This was done for the year 1981 as well as for the year 1982. From the selected answer scripts, the marks of the candidates in different subjects, namely; Thai; English; Mathematics; Science; and Social Studies were collected.

The aforesaid data were later on transferred on IBM cards with the help of the punching machines. The punched data were, further, varified twice on the verification machines to eliminate the possibility of committing any error at the time of punching. The investigator himself took the responsibility of preparing/adopting the suitable computer programmes and further processing of data on IBM computer at the Computer Center, Physical Research Laboratory, Ahmedabad. At every step, the above referred and some other precautionary measures were taken to maintain the accuracy of data and the results thereof.

3.5. Techniques of Data Analysis

In pursuance of the objectives of the present study various statistical analysis techniques were applied. These techniques and other methodological requirements are discussed here. It may be mentioned that these techniques have been explained for each of the two objectives separately. It has been done for the sake of clarity and convenience of the presentation. In addition to this, the rationale for using the different statistical techniques is also given. It is done in order to judge the suitability of the statistical techniques used to achieve the objectives of the present study.

Objective 1 : To study the effectiveness of the entrance test consisting of the following tests, viz;

- i. General Ability test composed of five subtests, namely,
 - a) Thai,
 - b) English,
 - c) Mathematics,
 - d) Science and
 - e) Social Studies;
- ii. Major Subject Test;
- iii. Teachers' Personality Test and
- iv. Occupational Interests Test to predict the performance of teacher trainees in Dip. in Education.

To achieve the first objective of the study the correlational and prediction analysis techniques were applied. The relationship to be studied in terms of correlation or prediction could be attempted in two ways, i.e. Product - moment correlation and Multiple correlation. By applying the Product-moment correlational technique, the degree of resemblance or correspondence between the two sets of marks is obtained. This would help in estimating the position of a student on one variable in case his position on the other variable is known. It will also indicate whether the marks available on two variables are independent of each other or there is some overlapping between the two. In general, it can be interpreted in terms of common variance or extent of homogeneity of variance in two sets of marks. When the predictor variables are two or more, the problem starts how to combine the marks on predictor variables to arrive at weighted total, which will have the highest possible correlation with the criterion variable. Such a correlation of best weighted total with the criterion is the Multiple correlation. The best weights which are also known as regression weights, are derived by fitting the multivariate linear regression equation. To find out the meaningful predictor variables, the Stepwise Multiple regression analysis method was applied. The aforesaid techniques were applied for predicting the performance on each of the courses at Dip. in Education as mentioned earlier

from each of the predictor variables and predicting with the combination of the predictor variables.

Objective 2: To study the factors underlying the entrance test.

In order to achieve this objective of the present study factor analysis technique was applied. For this purpose Principle Component factor analysis method was adopted. One point, which is considered important in the factor analysis is, when to stop factorisation or what are the meaningful factors, depends upon the proportion of the total variance accounted for by each factor. Harman(1968)¹ mentioned that on the basis of actual experience factor analysis have developed crude guidelines for "when to stop factoring", which have shown to be remarkably close to the more exact statistical test. If proportion of total variance, i.e., 75 percent (or 80 percent or 90 percent) is accounted for, any additional factor accounting for less than 5 percent or 2 percent would not be retained. The remaining factors having such a small impact on the total variance (less than 2 percent)

1. Harry H. Harman (1968): Modern Factor Analysis, Second Edition, Revised; The University of Chicago Press, Chicago and London.

could hardly have any practical significance. In the present study the factors accounting for more than 2 percent of the total variance were considered as meaningful factors. After obtaining the factor matrix, it was further subjected to rotation of axes to obtain the simple factor structure. For this purpose, Varimax Rotation technique was applied. The main advantages of this technique are that

- i. it gives the greatest interpretability or simplicity and a better approximation to the simple structure by maximising the variance, and
- ii. the solution by this method is invariant under changes in the composition of examination or test battery.

The above mentioned techniques were applied to identify the abilities or common factors measured by different entrance tests viz., in the year 1980, 1981 and 1982 separately.

It may be further mentioned that the analyses and interpretation of data have been presented in the next Chapter (Caption IV) under two different sections separately. Each section pertains to one of the two objectives respectively.