CHAPTER - III
PLAN AND PROCEDURE

For the collection of data, the investigator has to set up the design, specify the nature of population and simple, the sampling method, the tool used for collection of data and statistical techniques to be used for analysis of data. The present chapter has been confined to description of research methodology, description of population and sample, description of tools and statistical techniques for scoring and statistical techniques used.

3.1 METHODOLOGY

Research Method

In the present investigation, descriptive survey method was employed. The descriptive research method has been the most popular and the most widely used research method in education. It helps to explain educational phenomena in terms of the conditions or relationships that exist. At times, descriptive survey is the only means through which opinions, attributes, suggestions for improvement of educational practices and instructions and other data can be obtained.

The descriptive investigations are of immense value in solving problems about children, school organization, supervision and administration, curriculum, teaching methods and evaluation.

The descriptive research is of three types:

(i) Survey studies
(ii) Inter-relationship studies
(iii) Developmental studies

In this investigation, descriptive survey method was used. The present investigator tries to find out the general teaching competencies and components affecting teaching competence of science teachers in colleges of education in Haryana.
3.2 POPULATION

Population refers to any collection of specified group of human beings or non-human entities such as objects, educational institutions, and geographical areas.

The target population in the present study covers all Science Teachers working in Colleges of Education in Haryana.

3.3 SAMPLE

Most of the educational phenomena consist of a large number of units. It would be impracticable, if not impossible, to test, to interview or observe each unit of the population under controlled condition in order to arrive at the principle having universal validity. Sampling is the process by which a relatively small number of individuals, objects or events are selected and analyzed in order to find out something about the entire population from which it was selected. It is often desirable to reduce expenditure, save time and energy or produce precision and accuracy.

The logic of the theory of sampling is the logic of induction i.e. we proceed from particular (sample) to general (population) and all the results are expressed in the terms of probability. The representative item of the entire population is called a sample. A good sample must be as near tentative of the entire population as possible and ideally it must provide whole of the information about the population from which the sample has been drawn.

Owing to obvious constraints of field situation, it was not possible to encompass the entire population. Thus, 200 science teachers were selected by the random sampling method from the Colleges of Education. The Geographical Distribution of sample is shown in the Appendix-I.

3.4 TOOLS USED

After determining the sample of the study, the text step is to select suitable tool for the collection of the data. The success of the research depends upon how
objectively and adequately the required and relevant data are collected. The selection of the tool for a particular study depends upon various considerations such as the objectives of the study, personal competence of the investigator, scoring and interpretation of the results and reliability and validity of the scale. Taking all these factors into consideration the investigator used the following tools:

1. General Teaching Competency Scale (GTCS) by Passi and Lalitha (1979).
2. Teaching Aptitude Test by Dr. Jai Parkash& Dr. R.P. Shrivastava.
4. Teacher Attitude Inventory by S.P. Ahluwalia.
5. Teacher Effectiveness Scale by Kumar and Mutha, 1974.

3.5 DESCRIPTION OF THE TOOLS USED

3.5.1 General Teaching Competency Scale (GTCS)

General Teaching Competency Scale (GTCS) was developed by Passi and Lalitha (1979). There are 21 items related to 21 teaching skills which encompass the entire teaching-learning process in the classroom. They are related to five major aspect of classroom teaching, namely, Planning, Presentation, Closing, Evaluation and Managerial. The items are such that they are centred on teacher classroom behaviour in relation to pupil behavior. It is a 7-point rating scale measuring the use of the skill by the teacher in the classroom corresponding to each item ranging from ‘1’ for ‘Not at all’ to ‘7’ for ‘very much.’ The distribution of the various items related to the different classification of teaching skills is given in table 3.1.

The various teaching skills included are related to objectives of the lesson, content, selection, content organization, selection of audio-visual materials (Planning skills) introducing the lesson, fluency of questions, use of probing, questions, explaining, illustration with examples, stimulus variation, use of silence and non-verbal cues, increasing pupil participation (items 12 and 14), pacing use of
<table>
<thead>
<tr>
<th>Classification of Teaching skills</th>
<th>No. of Items</th>
<th>Serial No. of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td>4</td>
<td>1 to 4</td>
</tr>
<tr>
<td>Presentation</td>
<td>11</td>
<td>5 to 15</td>
</tr>
<tr>
<td>Closing</td>
<td>2</td>
<td>16 and 17</td>
</tr>
<tr>
<td>Evaluation</td>
<td>2</td>
<td>18 and 19</td>
</tr>
<tr>
<td>Managerial</td>
<td>2</td>
<td>20 and 21</td>
</tr>
<tr>
<td>Planning</td>
<td>4</td>
<td>1 to 4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>21</strong></td>
<td></td>
</tr>
</tbody>
</table>

black-board (presentation skills); achieving closure, giving assignment (closing skills), classroom evaluation, diagnosis of pupil difficulties (evaluation skills), recognizing attending behaviour and maintaining classroom discipline (managerial skills).

**Procedure for Use**

The GTC scale is generally used for measuring teaching competency of a teacher individually by a reliable observer or a group of reliable observers making direct observations of his classroom behaviour for the entire teaching period.

As the teacher teaches, the observer sits at the back for observation. At the end of the teaching period, he gives his ratings on the GTC scale against all the items. To facilitate this process, he may either mark frequencies or write verbal descriptions against each item which would help him in giving rations more objectively.

**Reliability of the Scale**

Since this is an observation tool, the more appropriate type of reliability is the inter-observer reliability. This scale has been used for doctoral research (Joshi, 1977; Passi, 1977) and the reported inter-observer reliability coefficients range 0.85 to 0.91. Inter-observer reliability can be better established when the observers train themselves for using the GTC scale.
Validity of the Scale

The scale has factorial validity. This was established by Rama (1979) in her doctoral study on Factorial structure of teaching competences among secondary school teachers. While developing an observation schedule, she made a list of teacher behaviours on the basis of behavioural components of the skills conceptualized by Passi (1976) and DeSales (1976) which constitute the very same skills included in the GTC Scale. The resulted into 85 verbal and non-verbal behaviours that could be clustered around 15 teaching skills table 3.2 gives the teaching skills and their behavioural components included.

**TABLE-3.2**

**DISTRIBUTION OF TEACHER BEHAVIOURS UNDER THE DIFFERENT TEACHING SKILLS**

<table>
<thead>
<tr>
<th>Teaching Skill</th>
<th>No. of Teacher Behaviours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introducing a lesson</td>
<td>4</td>
</tr>
<tr>
<td>Fluency in questioning</td>
<td>7</td>
</tr>
<tr>
<td>Probing questioning</td>
<td>5</td>
</tr>
<tr>
<td>Explaining</td>
<td>8</td>
</tr>
<tr>
<td>Stimulus variation</td>
<td>7</td>
</tr>
<tr>
<td>Silence &amp; Non-verbal cues</td>
<td>5</td>
</tr>
<tr>
<td>Pacing the lesson</td>
<td>4</td>
</tr>
<tr>
<td>Using audio-visual aids</td>
<td>6</td>
</tr>
<tr>
<td>Illustrating with examples</td>
<td>5</td>
</tr>
<tr>
<td>Using blackboard</td>
<td>4</td>
</tr>
<tr>
<td>Reinforcement</td>
<td>5</td>
</tr>
<tr>
<td>Achieving Closure</td>
<td>4</td>
</tr>
<tr>
<td>Recognising attending behavior</td>
<td>4</td>
</tr>
<tr>
<td>Classroom management</td>
<td>11</td>
</tr>
<tr>
<td>Giving assignment</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>85</strong></td>
</tr>
</tbody>
</table>
Based on a large number of classroom observations, the observation schedule was revised wherein one of the teaching skills was dropped because of high overlap. The final form of the schedule consisted of 86 well defined categories. Using this schedule 23 teachers from the city of Baroda (for pilot study) and 130 teachers from the City of Bangalore (Final study) were observed. It was possible to obtain Scott’s coefficient of inter-observer agreement ranging from 0.78 to 0.82 while observing teachers on the process variables chosen. Along with the 86 process variables measured using this observation schedule there were 17 presage variables related to teacher’s intelligence, attitude towards teaching, interest in teaching and teacher’s self-perception for introducing the lesson and 14 product variables related to student liking for introducing the class. These product variables related to the Student’s liking for various teaching skills used by the teacher were included to validate the process variables. All the 117 presage, process, and product variables related to teacher competency were factor analysed using principal component analysis technique. The factors identified and the percentage variance explained by each of them is given in table 3.3:

Since the maximum score on the scale can be 147 and the minimum score can be 21, theoretically, the norms in terms of means and vary from 21 to 147. But according to the observations made and the experience of the investigators, the mean scores on the GTC scale of 34 pre-service teacher trainees who were given training through 10 cycles of microteaching in some selected teaching skills vary from 52.11 to 125.44 the pooled SD of those 34 teacher trainees on the scale range from 13.7 to 15.5.
### TABLE-3.3
TEACHING COMPETENCIES AND THE VARIANCES EXPLAINED

<table>
<thead>
<tr>
<th>Teaching Competencies</th>
<th>Percentage of total variance</th>
<th>Percentage of common variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Teaching Competency</td>
<td>11.44</td>
<td>16.75</td>
</tr>
<tr>
<td>Competency of Teacher concern for students</td>
<td>8.64</td>
<td>12.64</td>
</tr>
<tr>
<td>Competency of using Audio-visual aids</td>
<td>7.53</td>
<td>11.03</td>
</tr>
<tr>
<td>Competency of professional perception</td>
<td>5.93</td>
<td>8.68</td>
</tr>
<tr>
<td>Competency of giving assignment</td>
<td>5.76</td>
<td>8.43</td>
</tr>
<tr>
<td>Competency of illustrating with examples</td>
<td>5.50</td>
<td>8.05</td>
</tr>
<tr>
<td>Competency of pacing while introducing</td>
<td>3.73</td>
<td>5.46</td>
</tr>
<tr>
<td>Competency of logical exposition</td>
<td>3.50</td>
<td>5.12</td>
</tr>
<tr>
<td>Competency of classroom management</td>
<td>3.21</td>
<td>4.70</td>
</tr>
<tr>
<td>Competency of the use of questions</td>
<td>3.06</td>
<td>4.48</td>
</tr>
<tr>
<td>Competency of initiating pupil participation</td>
<td>2.92</td>
<td>4.27</td>
</tr>
<tr>
<td>Competency of the use of blackboard</td>
<td>2.65</td>
<td>3.88</td>
</tr>
<tr>
<td>Competency of recognizing attending behavior</td>
<td>2.34</td>
<td>3.43</td>
</tr>
<tr>
<td>Competency of achieving closure</td>
<td>2.09</td>
<td>3.06</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>68.30</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

**Establishing Inter-observer Reliability**

While training observers for using the GTC scale and establishing interobserver reliability, the following steps are followed. This training is more effective when a group of observers are involved

(i) **Orientation to the concepts involved in the Scale**

The observers must become conceptually clear about the behavioural components related to each item in the scale. This is done by holding discussions with an expert or an already trained observer. Or else, they may read through the
useful references on the teaching skills included like Becoming Better Teacher (Passi, 1976), Allen and Ryan (1969), and such others.

(ii) Checking the written lesson plans

After having a clear understanding of the items included in the scale, practice in observation is done by checking the written lesson plans by the teachers or teacher trainees. Practice in observing most of the items in the scale except those related to classroom management, can be had through this approach. This is followed by discussion among observers.

(iii) Observation in Simulated Conditions

Observations on the scale are made by the observers for lessons taught in simulation or through role playing by one of the observers or a teacher. Discussions are held among observers about the observations made.

(iv) Observation or real classroom teaching

The observers observe lessons in real classroom setting as many as possible till they are clear about the behavioural components included in the items of the scale and confident about observing those components in action.

It is not necessary that all the observers have to undergo training through all the steps. If the observer is already aware of the behavioural components included in the items of the scale, he may straight away go to step (iv).

(v) Calculation of Inter-observer reliability

The observers are competent to use the scale only when they are able to establish product moment reliability coefficient to the extent of 0.8 to 0.9.

Applicability of the Scale

The GTC scale can be used to measure teaching competency of any teacher irrespective of age, sex, region socio-economic strata, grade level, subject, rural/urban and so on. It can be used to train teachers both at pre-service and in-service level. A teacher can use the tool for self-evaluation purpose also.

The scale’s efficiency in measuring teaching competency through self-
evaluation will be more when the teacher either views his video recorded or audio recorded lesson rather than when he introspects.

The scale has been widely used not only by researchers for doctoral studies (Passi, 1977; Joshi, 1977) but also in the national projects undertaken by the National Council of Educational Research and Training (Das, Passi and Singh, 1976, 1977, 1977). These projects are related to the study of effectiveness of microteaching in developing general teaching competence among teacher trainees belonging to teacher training institutions all over the country. The recent project is on studying the effectiveness of different strategies of integrating teaching skills on general teaching competence. The GTC scale has been used in all these projects to measure the criterion.

3.5.2 TEACHING APTITUDE TEST

For measuring the teaching aptitude of B.Ed. Pupil teachers, the investigator used teachers’ ‘Teaching Aptitude Test’ constructed and standardized by Dr.Jai Prakash and Dr. R.P. Srivastava. This questionnaire had 150 items consisted of 10 sub-tests in dimensions. It is a five-point scale test. A copy of the same is appended in the Appendix-II. The dimensions included are

1) **Cooperative Attitude**

This trait has been used for measuring the cooperative attitude of the teachers towards their taught, society and the nation.

2) **Kindliness**

This item has been used with regard to the general and particular attention of the teacher which is to be devoted for full growth and development of the personality of the pupil and to remove the hurdles and handicaps in the way of growth and development of pupil

3) **Patience**

The patience is an important trait of teacher’s personality, as he very often meets such a critical situation which needs patience and tolerance.
4) Wide interest

The teacher is not supposed to stick to his work of teaching the subjects only but he is also an active participant in co-curricular activities outside the institution.

5) Fairness

This element has been taken in the test to measure the fairness and impartiality which are the most essential traits of the teacher’s personality.

6) Moral Character

Moral status in the opinions of adults, especially concerning their adherence to the adult’s standard, have been tried to see through the items constituting this area.

7) Discipline

Discipline and problems of conduct in the classroom is very essential for successful teaching.

8) Optimism

Optimism outlook of a school-teacher is very essential for successful teaching.

9) Scholarly Taste

A successful teacher is deeply interested in the acquisition of knowledge. He reads book, magazines and newspapers. He takes interest in the discussion of educational problems.

10) Enthusiasm

Enthusiasm is very essential for the personality for successful teaching.

Reliability

The reliability of the test was estimated by the split half and test-retest methods on a sample of 100 cases. The inter-element correlations between the 10 components mostly center around +.5. Hardly anyone of them is less than +.5 and
none more than +.547. Elements Thus, the test had high reliability in both these methods.

**Validity**

The validity of the test was secured by computing a coefficient of correlation between scores of the test and the assessment mark obtained in the final examinations. The coefficient of correlation between the total marks of theory, practical teaching and craft was +.5, the obtained validity coefficient is quite satisfactory.

**Administration of the Teaching Aptitude Test**

This questionnaire was administered individually. The teachers were instructed that each item of the teaching aptitude questionnaire had five choices written on the answer sheet such as highly agree (HA), agree (A), undecided (I), disagree (D) and highly disagree (HD).

**3.5.3 WECHSLER ADULT PERFORMANCE INTELLIGENCE SCALE INDIAN ADAPTATION (WAIS-PERFORMANCE)**

For measuring the Intelligence of pupil teachers the investigator used Indian Adaptation Wechsler Adult Performance Intelligence Scale (WAIS-Performance) by Prabha Ramalingaswamy (1974):

**Description of the Tests**

Wechsler Adult Intelligence Scales consist of eleven sub-tests viz. information, Comprehension, Arithmetic, Similarities, Digit Span, Vocabulary, Digit Symbol, Picture Completion, Block Design, Picture Arrangement and Object Assembly. Out of these, first six from verbal scale, and the last five form the performance scale. There are fourteen major languages in India which are well developed and which have a rich literary tradition of their own. It would be a huge task to develop the verbal scale in all the fourteen languages. If the verbal scale was developed in Hindi speaking population alone. Taking into consideration the urgent need for the development of individual intelligence scale, it was felt that the
primary necessity at the present time was to develop a test which would have the
widest possible applicability and utility without reference to any particular
linguistic group. The final form of the test presented here, therefore consists of the
performance scale of Wechsler Adult Intelligence Scale viz. Picture Completion,
Digit Symbol, Block Design, Picture Arrangement and Object Assembly. Picture
Completion and Picture Arrangement tests have undergone extensive
modifications the details of which have been given elsewhere (Ramalingaswami,
1972). Digit Symbol, Block Design and Object Assembly remain the same as in
the original WAIS.

**Administration of the test**

The importance of establishing a complete rapport with the test subject was
realized from the very inception of the study. As this is an individual test for
evaluating intelligence for the purpose of establishing norms, a considerable
amount of time was spent on each subject in explaining the nature of the test and in
allaying any apprehension or anxiety on the part of the test subject before the
administration of the test. Every person was put completely at ease. Each
individual was assured that the results of the test would be confidential.

A minimum of fifteen minutes were spent on each subject in generating
interest and confidence in this manner. Hindi, English, Telugu and Tamil were the
languages that were used as media of communication. Whatever the language used,
the instructions remained exactly the same for all the test subjects.

Two problems came up during the course of the testing; these were with
regard to the accuracy of age and education as given by the subjects. Information
from several sources was pooled together like the age in certificates, statements by
the subjects and relationship to contemporary events-in order to get the age as
accurately as possible. In a land where unemployment is a burning problem, and
where age limit is prescribed for jobs of various kinds; where there are no birth
certificates, or where there is no importance of birthdays, the problems created by
miss-statements is a complex one. In view of the crucial importance of estimating
the age as accurately as possible, every direct and indirect method available was used in arriving at the probable age.

In securing information about the educational level of the individual subjects there were also some difficulties. In addition to the statements made by the subjects, wherever possible, information about their school or college and some contemporary event was probed. An interesting problem that came to surface here was that of persons who through sheer hard work and competence, rose to relatively high positions although they might have had a low level of formal education. Such persons do not readily admit that they were only middle scholars. It was only after building up a rapport and creating confidence in them that correct information could be eventually obtained.

Reliability

Reliability of Picture Completion, Block Design, Picture Arrangement and Object Assembly was worked out by using the formula widely referred to as Chronbach’s coefficient Alpha. Wechsler determined the reliability coefficient by using split-half technique (i.e.) by computing the correlation between the odd and even items and correcting the correlation coefficient for full length. This method was not used in the present investigation because in four out of five sub-tests is considerable difference in the number of items in each test, and in three tests the number of items is rather small.

Validity

In an effort to establish the validity of the test three techniques were used (1) construct validity, (2) Factorial validity and (3) comparison of results with those obtained by Wechsler for WAIS. A detailed account of this has been given elsewhere (Ramalingaswami, 1974). Here only a brief report is given.

Construct Validity

Construct validation consists of defining a measure in terms of numerous research findings. It is well established that age, education, and socio-economic
status affect the scores on intelligence test. In the present study an effort was made to establish construct validity of the test by examining the mean scores of persons belonging to different groups i.e. age, sex, education and socio-economic status. The mean total scores of the various groups were used for this analysis. Analysis of variances: two way classification with unequal numbers in cells (Rao, 1952) was used to test the significance of difference between the mean scores. The difference between the mean scores of these various groups were found to be significant at 0.01 level thereby indicating the construct validity of the test.

**Factor Analysis**

Factor Analysis of the sub-tests for the four age groups and for both sexes was done separately. The principal component method was employed followed by rotation using variances method. The factor matrices show a common factor present in all sub-tests and in every group. This factor while it can be termed as ‘general factor’ is akin to Spearman’s ‘G’ factor. In the present study which is primarily an adaptation of WAIS the presence of the ‘General factor’ with a communality that is close to the communality of the ‘G’ factor in WAIS goes further to establish the validity of the test.

**3.5.4 TEACHER ATTITUDE INVENTORY (TAI)**

The inventory has been constructed and standardized by Dr. S.P. Ahluwalia (1978). This inventory is a 90 item Likert instrument consisting of six sub scales Appendix-IV. These sub scales were developed by the Likert summated ratings procedure. Each scale has 15 statements that pertain to a particular aspect of prospective and practicing teacher’s professional attitudes. The six aspects debit within the inventory is, Attitude towards -

i. Teaching Profession

ii. Class-room Teaching

iii. Child-centred Practices

iv. Educational Process
v. Pupils

vi. Teachers

Keeping the rational of attitude scale construction in mind 90 psychometrically good attitude statements. 15 on each sub-scale were selected to constitute the final of the TAI. Out of 90 items 56 are in position declarative form and 34 of them are in negative form. Again 43 items are meant to assess attitude in favourable direction and 47 in unfavourable direction. Thus, the favourable-unfavourable continuum adequately measures the aforesaid six selected areas. Table 3.4 shows total number of favorable and Unfavorable items and their distribution in each sub-scale.

**TABLE-3.4**
**TOTAL NUMBER OF FAVOURABLE AND UNFAVOURABLE ITEMS AND SCALE WISE THEIR SERIAL NUMBER SUB SCALE**

<table>
<thead>
<tr>
<th>Sub Scale</th>
<th>Conditions</th>
<th>Item Serial Number</th>
<th>Total No. of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>F</td>
<td>1,8,20,33,41,66,85</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>UF</td>
<td>13,34,46,48,60,72,79,86</td>
<td>8</td>
</tr>
<tr>
<td>II</td>
<td>F</td>
<td>2,9,14,17,42,47,53,67</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>UF</td>
<td>35,38,59,61,65,73,84</td>
<td>7</td>
</tr>
<tr>
<td>III</td>
<td>F</td>
<td>3,11,16,21,27,39,49,62,64,80</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>UF</td>
<td>25,54,75,83,90</td>
<td>5</td>
</tr>
<tr>
<td>IV</td>
<td>F</td>
<td>15,28,36,43,50,55,71,87</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>UF</td>
<td>4,7,10,32,63,74,76</td>
<td>7</td>
</tr>
<tr>
<td>V</td>
<td>F</td>
<td>5,44,81,82,89</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>UF</td>
<td>18,22,29,31,37,51,56,58,70,77</td>
<td>10</td>
</tr>
<tr>
<td>VI</td>
<td>F</td>
<td>6,23,40,52,88</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>UF</td>
<td>12,19,24,26,30,45,57,68,69,78</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td>90</td>
</tr>
</tbody>
</table>

F = Favourable ➔ SA = 4, A = 3, U = 2, D = 1, SD = 0
UF = Unfavourable ➔ SA = 0, A = 1, U = 2, D = 3, SD = 4
Reliability

Reliability was estimated by the split-half (odd-even) method and found to be .79 (corrected to .88) for a sample of 239 prospective teachers. The test–retest reliability coefficients after the interval of 3 months and 9 months are found to be .59 (N=102) and .64(N=290). The details of reliability coefficients, indices of reliability, corrected reliability coefficients and standard errors of measurement are given in the table 3.5.

TABLE-3.5

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Method</th>
<th>Reliability Obtained r11</th>
<th>Coefficients Corrected R</th>
<th>Index of Reliability r100</th>
<th>Standard Error of Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Split half (odd-even)</td>
<td>.79</td>
<td>.88</td>
<td>.89</td>
<td>11.37</td>
</tr>
<tr>
<td>2.</td>
<td>Test-retest (3 months)</td>
<td>.58</td>
<td>.75</td>
<td>.76</td>
<td>16.73</td>
</tr>
<tr>
<td>3.</td>
<td>Test-retest (9 months)</td>
<td>.64</td>
<td>.78</td>
<td>.80</td>
<td>15.36</td>
</tr>
<tr>
<td>4.</td>
<td>Rational equivalence</td>
<td>.54</td>
<td>.70</td>
<td>.73</td>
<td>20.10</td>
</tr>
</tbody>
</table>

Validity

Determination of validity of attitude inventory is a hard task. The inventory appears to have content validity and the method of selecting items supports this supposition. In addition, differences in mean in mean scores were found among some selected known groups. The mean source for B, A, Part I & II students offering and not offering education. As an elective subject, B.Ed. Trainees and practicing teacher were computed and compared. The observed differences were found to be in the expected direction. The validity was also determined through stimulus group technique. Table 3.6 presents at a glance a summary of the obtained results.
Administration of Teacher Attitude Inventory

If you strongly agree, put tick (√) mark in the space under strongly agrees. If agree, put a tick (√) mark in the space under agree. If you are undecided or uncertain, put a tick (√) mark in the space undecided. If you disagree, put a tick (√) mark in the space under disagrees. If you strongly disagree, put a tick (√) mark in the space under strongly disagrees.

3.5.5 TEACHER EFFECTIVENESS SCALE (TES)

An effective teacher may be understood as one who helps in the development of basic skills, understanding proper work habits, desirable attitudes, value judgment and adequate personal adjustment of the student. The teacher effectiveness scale (TES) in its final form consists of 69 highly discriminating items (Kumar and Mutha, 1974). The booklet of this test is enclosed in Appendix-V.

Reliability

The split-half reliability (correlating the odd even items) of the scale, applying the Spearman-brown formula is found to be .67 (N=100) with an index of reliability of .82.

The test-retest reliability of the scale is also studied. It is found to be .75 (N=60) with an index of reliability of .85. With two months interval time (Kumar & Mutha, 1974). The two r-values have been found to be significant at .01 levels, showing the scale is highly reliable both in terms of its internal consistency and stability of scores.

Validity

The face validity of the measures is fairly high. The content validity is ensured as the items for which there has been 100 percent agreement amongst judges regarding their relevance to teacher effectiveness are included in the scale.

Further, the scale has been validated against principal’s ratings. The correlation between principal’s rating and self- rating is found to be .77 (N=50), with an index of reliability of .87.
Administration of tools

The TES is a self-administering scale. The purpose of the scale is frankly explained to the subjects. It is assured that their replies would be kept confidential. The subjects are requested to read the Instruction carefully and ask the tester if there is any difficulty in the Understanding of the instruction. It has been emphasized that no item should be omitted and there is nothing ‘right’ or ‘wrong’ about these Questions. There is no time limit for the scale (ii) Scoring All the 69 items of the scale are positively worded Items are given a score of ‘5’, ‘4’, ‘3’, ‘2’, ‘1’, for ‘strongly Agree’, ‘agree’, ‘undecided’, ‘disagree’ and ‘strongly disagree’ respectively. The sum of these values gives the teacher –effectiveness Score for the subject. The total score varies from 69 to 345, showing least Teacher Effectiveness to highest Teacher Effectiveness.

3.6 DATA COLLECTION

After the selection of the suitable tools, it was necessary to obtain the information on every item included in the questionnaire. The investigator visited the selected Colleges of the Ambala Commissionrate. At first, he took the permission from the heads of the institutions and then collected data from the pupil-teachers. The scoring procedure of the different tools used in the present study is presented in the following sub-heads.

3.7 SCORING PROCEDURE

Scoring procedure is given below:

Scoring of GCTS

The sum of the ratings against all the 21 items constitutes the score on General Teaching Competency (GTCS) scores of the teacher being observed. The maximum score possible is 147 and the minimum is 21.

Scoring of WAPIS-PR

Converting Raw Scores to Scaled Scores

When the items for each of the tests have been scored and the points summed, the result is the raw score for each test. These raw scores are then
transferred to the summary section on the front of the Record Form. Immediately
to the front of the summary section there is a table of scaled score equivalents. This
table (which also appears in the manual as table No. 15) s used to convert the raw
scores to scaled scores for all subjects regardless of age or sex. The raw score
earned by the subject for a test is located in the column of the table for that test.
Reading horizontally from a particular raw score to the extreme or right column of
the table, the examiner will find the equivalent scaled score. This scaled score is
entered in the appropriate space in the summary section just to the right of the
previously recorded raw score. When this is done for all of the tests, the summary
section shows a column of raw scores and an adjacent column of scaled scores.
Thereafter, no further attention need be given to the raw scores since the equivalent
scaled scores are more meaningful and permit arithmetical treatment.

Occasionally the result from one of the tests can be used, because they may
have been rendered invalid during the administration or a special handicap of the
subject might have made the administration of that test inadvisable altogether of
that test inadvisable altogether. In such cases, the sum of the scaled scores must be
prorated to obtain the full scaled score that can be used in deriving an I.Q. If one
test has been omitted the sum of the scaled scores for the four remaining tests is
multiplied by five fourth i.e. 5/4 to determine the full score. Prorated score should
be labeled in the margin next to their appearance in the summary section of the
Record Form by Symbol PRO.

Determining the I.Q.’s

In order to convert the scaled scores into intelligence Quotients Tables A, B, C and D given on pages 46, 47, 48 and 49 are to be used. Find out the subjects
age and use the appropriate table. For instance if the subject age is A year’s 21
months use table B; if he is 42 years use table D. Find out the total scaled score of
the subject and see in the appropriate table- you will have intelligence quotient just
opposite the total score.
Scoring of Teaching Aptitude Test

The teaching aptitude test consists of 150 questions. It has statements with five choices in responses. It has both positive and negative statements. The test has two sets of scoring keys one, for the Right (R) and the other, for Wrong (W) score. Accordingly the weights of +3, +2 and +1 are given to right responses of HA, A, and I or HD, D and I, respectively, whichever is correct as is visible through the blank circles of the Right keys. Similarly the weights of -3, -2 and -1 are assigned to the wrong answers of HA, A and I or HD, D and I whichever is visible through blank circle of wrong keys. Thus, the scoring keys gives two sets of scores separately, i.e., Right and wrong scores. The correct score is obtained by subtracting the wrong from the Right scores (R-W) and this reminder is an individual’s raw scores.

Scoring of Teacher Attitude Inventory

Each item alternative is assigned a weight ranging from 4 (Strongly Agree) to 0 (Strongly Disagree) for favourable items. In the case of unfavourable items range of weights is reversed i.e. from 0 (Strongly Agree) to 4 (Strongly Disagree). The attitude score of a subject is the sum total of item scores of all the six subscales. The theoretical range of scores is 0 to 360 with the higher score indicating the more favourable attitude towards teaching and allied aspects.

Scoring of Teacher Effectiveness Scale

The teacher effectiveness scale in its final form consists of 69 highly discriminating items. This scale was prepared by Kumar and Mutha. This inventory is in Hindi. All the 69 items of the scale are positively worded. Items are scored as 5, 4, 3, 2, and 1. For strongly agree undecided, disagree and strongly disagree respectively. The total score of the respondent is obtained by adding the scores given for each item in the scale. The total scores varied from 69 to 345 showing the least teacher effectiveness to high teacher effectiveness.
3.8 STATISTICAL TECHNIQUES EMPLOYED

In the present study the following statistic techniques are employed:

1. Mean; Standard Deviation;
2. Pearson’s Product Moment Coefficient of Correlation;
3. t-test.

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