CHAPTER 4
METHODOLOGY

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4.1 INTRODUCTION

The methodology chapter describes the exact steps that had undertaken to address the hypotheses or research questions. The goal of this chapter is to provide a clear and complete description of the specific steps followed in the present study. The methodology outlines the general methods that the researcher plans to use to draw conclusions about the problem as well as the reasons for using the stated methods. The methodology should provide a description of methods that will be used to collect and analyze data, in order to establish the credibility of the topic. Therefore, the methodology should not only help to establish that the researcher has a well-developed plan of approach for tackling the research, but also that the researcher is aware of inherent problems within his or her own methodology that could impact the final results. As such, the methodology is the first step towards establishing the credibility and authority of the researcher.

4.2 METHOD ADOPTED FOR THE STUDY

Considering the different aspects of the study the investigator had decided to adopt normative survey method for the present study. It is an important method in descriptive research, which concerns with conditions or relationships that exist, opinions that are held, processes that are going on, effects that are evident, or trends that are developing. The term survey suggests the gathering of evidence relating to current conditions. The normative implies the determination of normal or typical conditions or practices and the term normative survey is generally used for the type of research which proposes to ascertain what is the normal or typical condition or practice at the present time.

The survey method gathers data from a relatively large number of cases at a particular time. It is not concerned with characteristics of individuals as individuals. It
is concerned with the generalized statistics that result when data are abstracted from a number of individual cases. Survey deals with clearly defined problems and has definite objectives. It requires an imaginative planning, a careful analysis and interpretation of data and a logical and skillful reporting of findings.

4.3 VARIABLES SELECTED

The present study is entitled as Influence of Teacher Education Programme on Emotional Competence, Creative Thinking and Locus of Control of Student Teachers at Secondary Level. The variables of the study are Teacher Education Programme, Emotional Competence, Creative Thinking and Locus of Control. Among these Teacher Education Programme is taken as the independent variable, whereas Emotional Competence, Creative Thinking and Locus of Control are considered as dependent variables.

4.4 SAMPLE FOR THE STUDY

A population is any group of individuals that have one or more characteristics in common that are of interest to the researcher, whereas sample is a small proportion of a population selected for observation and analysis. By observing the characteristics of the sample, one can make certain inferences about the characteristics of the population from which it is drawn.

In the present study the student teachers at secondary level in Kerala are taken as the population. Stratified random sampling method was used to select the sample from the population. The sample for the study consists of 800 student teachers from various teacher education colleges in Kerala. Due representation was given to relevant demographic variables, such as educational qualification, marks obtained in
qualifying examination, optional subject, locale of the institution, and type of management of the institution, during the selection of sample.

Breakup of the final sample based on relevant demographic variables are given in Table 4.1

Table 4.1

Breakup of the Final Sample Based on Demographic Variables

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Demographic Variable</th>
<th>Number</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Educational qualification</td>
<td>U.G.</td>
<td>440</td>
</tr>
<tr>
<td></td>
<td></td>
<td>P.G.</td>
<td>360</td>
</tr>
<tr>
<td>2</td>
<td>Marks obtained in</td>
<td>Below 60%</td>
<td>165</td>
</tr>
<tr>
<td></td>
<td>qualifying examination</td>
<td>60% - 80%</td>
<td>496</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Above 80%</td>
<td>139</td>
</tr>
<tr>
<td>3</td>
<td>Optional subject</td>
<td>Science</td>
<td>353</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Language</td>
<td>258</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Social science</td>
<td>189</td>
</tr>
<tr>
<td>4</td>
<td>Locale of institution</td>
<td>Rural</td>
<td>370</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Urban</td>
<td>430</td>
</tr>
<tr>
<td>5</td>
<td>Type of institution</td>
<td>Govt.</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aided</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unaided</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>University</td>
<td>200</td>
</tr>
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</table>
4.5 TOOLS USED

The selection of instrument or tool for data collection is much important as the findings or conclusions of the study are based up on the type of information collected. The research tool provides the input into a study and therefore the quality and validity of the findings are solely dependent on it. By keeping various objectives of the study the investigator decided to use the following tools for the present study.

1. General Data Sheet
2. Emotional Competence Scale
3. Creative Thinking Test
4. Locus of Control Scale

4.5.1 PERSONAL DATA SHEET

For collecting personal information of the subjects the investigator prepared a personal data sheet for student teachers. Its main purpose was to collect data related to demographic variables. The items included in the personal data sheet are name of the student, name of the institution, gender, educational qualification, mark obtained in qualifying examination, optional subject, type of management of institution and locale of the institution. The English and Malayalam version of personal data sheet are given as Appendix – I and II

4.5.2 EMOTIONAL COMPETENCE SCALE

For the purpose of collecting data related to emotional competence the investigator decided to construct a new Emotional Competence Scale with the help of the supervising teacher.
4.5.2.1 Construction of Emotional Competence Scale

The scale was constructed in Likert scale method, which provides a series of statements to which participants can indicate degrees of agreement and disagreement. The participant simply checks the space that best reflects the degree of agreement or disagreement with each statement.

The scale for emotional competence was prepared on the basis of five dimensions of emotional competence. These dimensions were selected based on emotional competence framework suggested by Goleman (1995). Self awareness, self regulation, motivation, empathy and social skills are the dimensions selected for the preparation of the present scale. Among these the first three constitute personal competence and the other two constitute social competence.

4.5.2.2 Preparation of Draft Scale

The items for the draft scale were prepared based on the five dimensions and its sub dimensions. The items were prepared with the scope for five alternative responses namely, strongly agree, agree, undecided, disagree and strongly disagree. A number of items were written based on the emotional situations of everyday life and the literatures related to emotional competence. Expert opinions were considered to find out the weakness and workability of the items. The difficulties in responding to the items and a rough estimate of the limits for responding to the items were noted. This step helped the investigator to modify certain statements which are vague and questionable. The statements were corrected and rewritten several times to prepare the final draft scale with 120 statements.
4.5.2.3 The Tryout

The draft scale was administered to randomly selected 200 student teachers at secondary level with due representation to all demographic variables. Clear instructions were given to them. They were asked to respond to each statement by choosing any one of the five options which is most appropriate according to them.

4.5.2.4 Scoring

The collected responses were scored with the help of scoring key. Scoring was done by awarding 5, 4, 3, 2, and 1 marks to the responses Strongly agree, agree, undecided, disagree, and strongly disagree respectively for favourable statements. The scores were reversed for unfavourable statements. The scoring pattern is given in Table 4.2.

Table 4.2

<table>
<thead>
<tr>
<th>Sl. No.</th>
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</tr>
</thead>
<tbody>
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<td></td>
<td></td>
<td>Favourable</td>
</tr>
<tr>
<td>1</td>
<td>Strongly Agree</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Agree</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Undecided</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Disagree</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Strongly disagree</td>
<td>1</td>
</tr>
</tbody>
</table>

4.5.2.5 Standardisation Procedure

The standardization of the emotional competence scale was done by item analysis. Item analysis works out the effectiveness of each item in assessing all the
alternative responses. The items were analysed quantitatively and qualitatively. Qualitative analysis included the evaluation of items in terms of content and form.

Based on the nature of items in the scale the investigator decided to calculate the t-value for quantitative item analysis. The t-value helps to measure the ability of a statement in differentiating high and low groups. For this purpose the responses of 200 student teachers were considered. They were arranged in ascending order based on their performance for the total scales and subscales in try out. The highest 27% were selected as the higher group and the lowest 27% were selected as the lower group separately for total scale and each subscale. The t-value of each item were calculated using the formula,

$$t = \frac{M_1 - M_2}{\sqrt{\frac{\sum fx_1^2 - (\sum fx_1)^2}{N_1} + \frac{\sum fx_2^2 - (\sum fx_2)^2}{N_2}}} / \sqrt{N(N - 1)}$$

where,

- $M_1$ - The mean score of the higher group for a given statement
- $M_2$ - The mean score of the lower group for a given statement
- $x_1$ - The score of an individual in higher group for the statement.
- $x_2$ - The score of an individual in lower group for the statement
- $N_1$ - Number of subjects in higher group.
- $N_2$ - Number of subjects in lower group
4.5.2.6 Item Selection

The statements for the final scale were selected based on the t-value of each item for the total scale and subscales. The items with a t-value of 2.58 and above for both total scale and subscale were selected for the final scale at .01 level of significance. Some statements came under this range were rejected for balancing the number of statements in favourable and unfavourable group and in different dimensions. The details of the t-values obtained for each item in draft scale are given in Appendix- V.

After standardization 75 statements were selected for the final scale. Fifteen statements were included in each dimension such as self awareness, self regulation, motivation, empathy and social skills. Among the total items in the final scale 38 statements are favourable whereas 37 are unfavourable.

4.5.2.7 Reliability

Reliability is the quality of a tool to produce stable and trustworthy results. In order to ensure the reliability of emotional competence scale Guttman split half coefficient and Cronbach’s alpha were found for the total scales and subscales.

The computed Guttman split half coefficient for final emotional competence scale was .881. In the case of subscales it was .673 for self awareness, .670 for self regulation, .753 for motivation, .713 for empathy and .769 for social skills.

The obtained value of Cronbach’s alpha for final emotional competence scale was .936. In the case of subscales it was found to be .750 for self awareness, .696 for self regulation, .735 for motivation, .792 for empathy and .802 for social skills.

All these values of reliability for total scale and subscales reveal that the emotional competence scale shows fairly good reliability.
4.5.2.8 VALIDITY

An index of validity shows the degree of accuracy to which a test measures what it intends to measure, when compared with accepted criteria.

One of the essential qualities of any valid test is that it should be highly reliable. The present scale shows fairly good reliability coefficients.

Face validity checks does the tool looks like a measure of the construct of interest. The items included in the present test were constructed based on the literature related to emotional competence. The real life experiences that constitute emotional competence were also considered. The applicability of each item in the final scale in distinguishing emotionally competent and incompetent student teachers was established through pilot study.

Whereas, content validity tells does the tool contain items from the desired content domain. In the present scale the items were constructed based on the dimensions of suggested by Goleman. The items that come under all these dimensions were included in the final scale. The presence of items that represents the sub dimensions of each dimensions were also ensured in the final scale. Sufficient coverage of the content in the scale was ensured on the basis of the opinion of experts from relevant fields

4.5.3 CREATIVE THINKING TEST

In order to find out the creative thinking of student teachers the investigator decided to construct a new test for creative thinking with the help of the supervising teacher.
4.5.3.1 Construction of Creative Thinking Test

The creative thinking test was prepared based on the pattern of test of creative thinking suggested by Guilford. The three dimensions of creative thinking considered for the present test were originality, fluency and flexibility.

4.5.3.2 Preparation of Draft Test

The items for the draft test were prepared based on three dimensions of creative thinking such as originality, fluency and flexibility. Three categories of tasks such as verbal tasks using verbal stimuli, verbal tasks using nonverbal stimuli and nonverbal tasks using nonverbal stimuli were prepared for the test.

Verbal tasks with verbal stimuli included the following tasks.
Just suppose task – Here the subject is confronted with an improbable situation and asked to predict the possible outcomes from the introduction of a new or unknown variable.
Alternate uses task – It calls for interesting and unusual uses for common objects.
Impossibilities task – In this task the subjects are asked to list as many impossibilities as they can.
Consequences task – Here the subjects were required to list out the consequences of a given situation
Situation task – Subjects were give common problems and asked to think as many solutions to these problems.
Improvement task – In this task the subjects are given the names of common objects and are asked to suggest as many ways as they can to improve them. They are asked not to bother about whether or not it is possible to implement the change thought of.
The verbal tasks using nonverbal stimulus constructed for this test are as follows.

Ask and guess task – It requires the individual first to ask questions about a picture. Next he is asked to make guesses or formulate hypotheses about the possible causes of the events depicted.

Pattern meaning task – In this task a pattern or picture was given and the subject was directed to give the meanings came into their mind while seeing the stimuli.

Non verbal tasks included in this test are;

Picture construction task – Geometrical or free style shapes are given to the subject and asked to draw a picture in which the given shape is an integral part.

Incomplete figure task – An incomplete figure with some objects are given to the participants and asked to complete it with more objects and lines to get a holistic outlook.

Circles and squares task – Here the subjects are confronted with a group of circles and/or rectangles and instructed to construct a whole picture or design by adding more lines.

The items were prepared with the scope of measuring three aspects of creative thinking such as originality, fluency and flexibility. Several items were prepared based on the selected tasks and after referring the literatures related to it. Expert opinions were considered to find out the weakness and workability of the items. The difficulties in responding to the items and a rough estimate of the limits for responding to the items were noted. This step helped the investigator to modify certain items which were vague and questionable. The items were corrected and reassessed several times to prepare the final draft test and it contained 35 items.
4.5.3.3 The Tryout

The draft test was administered to randomly selected 200 student teachers at secondary level with due representation to all subsamples. Clear instructions were given to them. They were asked to respond to each item by carefully reading the instructions and to give maximum responses comes in their mind.

4.5.3.4 Scoring

Each response given by the respondents were evaluated in terms of originality, fluency and flexibility

Originality – Each Response for every item was compared to the total amount of responses from all the subjects. Responses that were given by only 1% were considered as unique and a score of 3 was given to them. Responses that were given by 5% were considered as unusual and a score of 2 was given to them. Responses that were given by more than 5% were considered as usual and a score of 1 was given to them.

Fluency – It constituted the total number of responses given for each item.

Flexibility – The responses given for each item is categorized and the number of categories got for each item is considered as fluency.

The total score of originality, fluency and flexibility constituted creative thinking score of each item.

4.5.3.5 Standardisation Procedure

The standardization of the creative thinking test was done by item analysis. The items were analysed quantitatively and qualitatively. Qualitative analysis included the evaluation of items in terms of content and form.
Based on the nature of items in the test the investigator decided to calculate the t-value for quantitative item analysis. For this purpose the responses of 200 student teachers were considered. They were arranged in ascending order based on their performance in try out. The highest 27% were selected as the higher group and the lowest 27% were selected as the lower group. The t-value of each item were calculated using the formula,

$$ t = \frac{M_1 - M_2}{\sqrt{\frac{\sum f x_1^2 - (\sum f x_1)^2}{N_1} + \frac{\sum f x_2^2 - (\sum f x_2)^2}{N_2}}} \frac{N_1 N_2}{N(N - 1)} $$

where,

- $M_1$ - The mean score of the higher group for a given statement
- $M_2$ - The mean score of the lower group for a given statement
- $x_1$ - The score of an individual in higher group for the statement.
- $x_2$ - The score of an individual in lower group for the statement
- $N_1$ - Number of subjects in higher group
- $N_2$ - Number of subjects in lower group

### 4.5.3.6 Item Selection

The items for the final test were selected based on the t-value for each item. The items with a t-value of 2.58 and above were selected at the level of significance .01. The items with t-value less than 2.58 were rejected. The t-value of each item in the draft test are given in Appendix - XI.
Among the 32 items in the draft test 25 were selected for the final test. All categories of task incorporated in the draft test except impossibilities task were included in the final scale after standardization.

4.5.3.7 Reliability

Reliability is the quality of a test to produce stable and trustworthy results. In order to ensure the reliability of creative thinking test Guttman split half coefficient and Cronbach’s alpha were found for the total test and dimensions of the test.

The computed Guttman split half coefficient for final creative thinking test was .916. In the case of dimensions of creative thinking it was .712 for fluency, .739 for flexibility and .695 for originality.

The obtained value of Cronbach’s alpha for final creative thinking test was .947. In the case of dimensions of creative thinking it was found to be .805 for fluency, .829 for flexibility and .817 for originality.

All these values of reliability for total test and its dimensions reveal that the creative thinking test shows fairly good reliability.

4.5.3.8 VALIDITY

An index of validity shows the degree of accuracy to which a test measures what it intends to measure, when compared with accepted criteria.

One of the essential qualities of any valid test is that it should be highly reliable. The present scale shows fairly high reliability coefficients.

Face validity checks, does the tool looks like a measure of the construct of interest. The items included in the present test were constructed after reviewing the literature related to creative thinking. The applicability of each item in the final scale
in distinguishing student teachers with high and low creative thinking was established through pilot study.

Whereas, content validity tells does the tool contain items from the desired content domain. In the present scale the items were constructed based on the dimensions suggested by Torrance. Different types of task that is competent of assessing creative thinking were included in the test. The items for the test were selected in such a manner that each item was capable of assessing fluency, flexibility and originality. Sufficient coverage of the content in the scale was ensured on the basis of the opinion of experts from relevant fields.

4.5.4 LOCUS OF CONTROL SCALE

For the purpose of measuring locus of control of the student teachers the investigator decided to construct a new locus of control scale with the help of supervising teacher.

4.5.4.1 Construction of Locus of Control Scale

The scale was constructed in the Likert scale method. The scale for measuring locus of control was prepared on the basis of three dimensions. These dimensions were selected from the description of Levenson about locus of control. Individual control, chance control and powerful others control were the dimensions selected for the preparation of the present scale.

4.5.4.2 Preparation of Draft Scale

The items for the draft scale were prepared based on three dimensions with the scope for five alternative responses namely, strongly agree, agree, undecided, disagree and strongly disagree. Several items related to locus of control were written based on real life experiences and literature. Expert opinions were considered to find out the
weakness and workability of the items. The difficulties in responding to the items and a rough estimate of the limits for responding to the items were noted. This step helped the investigator to modify certain statements which are vague and questionable. The statements were corrected and rewritten several times to prepare the final draft scale and it contained 62 statements.

4.5.4.3 The Tryout

The draft scale was administered to randomly selected 200 student teachers at secondary level with due representation to all demographic variables. Clear instructions were given to them. They were asked to respond to each statement by choosing any one of the five options which is most appropriate according to them.

4.5.4.4 Scoring

The collected responses were scored with the help of the scoring key. Scoring was done by awarding 5, 4, 3, 2, and 1 marks to the responses strongly agree, agree, undecided, disagree and strongly disagree respectively for all statements. The scoring pattern is given in Table 4.3

Table 4.3

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Options</th>
<th>Scores given</th>
</tr>
</thead>
<tbody>
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<td>Strongly Agree</td>
<td>5</td>
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<tr>
<td>2</td>
<td>Agree</td>
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<td>3</td>
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</tr>
<tr>
<td>4</td>
<td>Disagree</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Strongly Disagree</td>
<td>1</td>
</tr>
</tbody>
</table>
4.5.4.5 Standardisation Procedure

The standardization of the locus of control scale was done by item analysis. The items were analysed quantitatively and qualitatively. Qualitative analysis included the evaluation of items in terms of content and form.

Based on the nature of items in the scale the investigator decided to calculate the t-value for quantitative item analysis. For this purpose the responses of 200 student teachers were considered. They were arranged in ascending order based on their performance in try out. The highest 27% were selected as the higher group and the lowest 27% were selected as the lower group separately for total scale and each subscale. The t-value of each item were calculated using the formula,

\[
t = \frac{M_1 - M_2}{\sqrt{\frac{\sum fx_1^2 - (\sum fx_1)^2}{N_1} + \frac{\sum fx_2^2 - (\sum fx_2)^2}{N_2}}}
\]

where,

- \(M_1\) - The mean score of the higher group for a given statement
- \(M_2\) - The mean score of the lower group for a given statement
- \(x_1\) - The score of an individual in higher group for the statement.
- \(x_2\) - The score of an individual in lower group for the statement
- \(N_1\) - Number of subjects in higher group.
- \(N_2\) - Number of subjects in lower group
4.5.4.6 Item Selection

The statements for the final scale were selected based on the t-value for each item. The items with a t-value of 2.58 and above were selected at the level of significance .01. The items with t-value less than 2.58 were rejected. The t-value obtained for each item in draft scale is given in Appendix - XVI

After standardization 45 statements were selected for the final scale. Fifteen statements were included in each dimension such as individual control, chance control and powerful others control

4.5.4.7 Reliability

Reliability is the quality of a tool to produce stable and trustworthy results. In order to ensure the reliability of locus of control scale Guttman split half coefficient and Cronbach’s alpha were found for the total scale and subscales.

The computed Guttman split half coefficient for final locus of control scale was .792. In the case of subscales it was .702 for internal control, .794 for chance control and .678 for powerful others control.

The obtained value of Cronbach’s alpha for final locus of control scale was .816. In the case of subscales it was found to be .728 for internal control, .803 for chance control and .709 for powerful others control.

All these values of reliability for total scale and subscales reveal that the locus of control scale shows good reliability.

4.5.4.8 Validity

An index of validity shows the degree of accuracy to which a tool measures what it intends to measure, when compared with accepted criteria.
One of the essential qualities of any valid test is that it should be highly reliable. The present scale shows fairly high reliability coefficients.

Face validity checks, does the tool looks like a measure of the construct of interest. The items included in the present scale were constructed based on the literature related to locus of control. The real life experiences that reflect factors controlling behavior of a person were also considered. The applicability of each item in the final scale in distinguishing student teachers with high and low internal, chance as well as powerful others control was established through pilot study.

Meanwhile, content validity tells does the tool contain items from the desired content domain. In the present scale the items were constructed based on the dimensions of locus of control suggested by Levenson. The items that come under all three dimensions of locus of control were included in the final scale. Sufficient coverage of the content in the scale was ensured on the basis of the opinion of experts from relevant fields.

4.6 COLLECTION OF DATA

The data for the present study was collected from different teacher education colleges in Kerala. The data were collected in two sessions for the present study. The first session of the data collection was done at the beginning stage of the course in order to assess their entry behavior. The second session was done at the last phase of the course for the same batch. The availability of same student teachers at both the sessions was ensured during data collection. Before starting data collection the investigator sought permission from the heads of each institution and asked for their co-operation in the process. The emotional competence scale, creative thinking test and locus of control scale were given in person to the student teachers in the class.
room. The rules and procedures were explained stating that no question should be omitted and assuring them that their responses would be kept confidential. The subjects were provided with the tools and they were asked to fill in the response appropriately in given space. The response sheets were collected from the respondents after making the response.

4.7 CONSOLIDATION OF DATA

The collected responses were scored systematically by using appropriate scoring key. The relevant data collected from the sample were consolidated for the purpose of analysis. This was done by assigning an identification number for each subject in the coding sheet. Then against the number the details of the personal data like educational qualification, mark obtained in qualifying examination, optional subject, locality of institution and type of management were noted. Then the scores for each statement given by the subjects were noted. Majority of the calculations and analysis of these data were done using SPSS.

4.8 STATISTICAL TECHNIQUES USED

Based on the nature of the study the investigator selected several statistical techniques for the present study. The important statistical techniques used in the study includes Computation of Percentage, Significance of Difference Between Means, Analysis of Variance, Tukey HSD, Paired Samples t-test, Pearson’s Coefficient of Correlation and Significance of Difference Between Two r’s.