CHAPTER-IV
RESEARCH METHODOLOGY

4.1 Introduction

Research and scientific enquiry both are generally considered as synonymous. The only difference between the two is that it is possible to employ scientific method without research but it is not possible to conduct any research without employing scientific method.

Research in common parlance refers to a search for knowledge. One can also define research as a scientific and systematic search for pertinent information on a specific topic. In fact, research is an art of scientific investigation. The Advanced Dictionary of Current English (1952) lays down the meaning of research as "a careful investigation or inquiry especially through search for new facts in any branch of knowledge". Redman and Mory (2009) define research as a "systematized effort to gain the knowledge". It is actually a voyage of discovery. We all possess the vital instinct of inquisitiveness for, when the unknown confronts us, we wonder and our inquisitiveness makes us probe and attain full understanding of the unknown. This inquisitiveness is the mother of all knowledge and the method, which man employs for obtaining the knowledge of whatever the unknown, can be termed as research.

Slesinger and Stephenson (2009) in the Encyclopedia of Social Sciences define research as "the manipulation of things, concepts or symbols for the purpose of generalizing to extend, correct or verify knowledge, whether that knowledge aids in construction of theory or in the practice of an art". As such the term 'research' refers to the systematic method consisting of enunciating the problem, formulating a hypothesis, collecting the facts or data, analyzing the facts and reaching

certain conclusions either in the form of solutions toward the concerned problem or in certain generalization for some theoretical formulation (Kothari 2009).

A research cannot be evaluated unless its procedure is reported in sufficient detail. The investigator should adopt a systematic and appropriate procedure in conducting the research. A careful consideration is being given in the selection of tools, collection of data and analyses of data. The accuracy, reliability and validity of the research findings depend on the correct and careful choice of the tools. The details regarding the variables, hypotheses choice of the tools, selection of the sample, collection of data and analyses are outlined in this chapter.

This chapter signifies the methodological framework of the study and consists of the following aspects:

(i) Research Design
(ii) Variables of the study
(iii) Hypotheses
(iv) Tools used
(v) Sample of the study
(vi) Data collection
(vii) Data analyses

Each of these aspects has been briefly described hereunder:

4.2 Research Design

The research design specifies the questions to be investigated, the process of sample selection, methods of procedure to be followed, measurements to be obtained and comparison and other analyses to be made. The present study is a descriptive survey research method.

4.3 Variables of the Study

In the present study, following variables were considered.

Independent Variables

- Emotional Intelligence

- Self-Esteem

- Personal Effectiveness

Dependent Variable

- Academic Achievement

Moderator Variables

- Age (below 25 years, 26-30 years and above 30 years)

- Gender (Male and Female)

- Educational qualification (Undergraduate and Postgraduate)

- Discipline (Arts and Science)

- Location (Rural and Urban)

- Type of Management (Government, Aided and Unaided)

- Parents Income (Below *रु.2000, रु.2001-5000, रु.5001-10000 and Above रु.10000)*

4.4 Hypotheses of the Study

1. **Hypothesis:** There is no significant difference between age groups (below 25 years, 26-30 years and above 30 years) of student-teachers of colleges of education with respect to academic achievement.

2. **Hypothesis:** There is no significant difference between male and female student-teachers of colleges of education with respect to academic achievement.

3. **Hypothesis:** There is no significant difference between graduate and postgraduate student-teachers of colleges of education with respect to academic achievement.

4. **Hypothesis:** There is no significant difference between Arts and Science discipline student-teachers of colleges of education with respect to academic achievement.

5. **Hypothesis:** There is no significant difference between student-teachers of urban and rural colleges of education with respect to academic achievement.

6. **Hypothesis:** There is no significant difference between student-teachers of aided, unaided and Government colleges of education with respect to academic achievement.

7. **Hypothesis:** There is no significant difference between parents income group (below *रु.2000, रु.2001-5000, रु.5001-10000 and above रु.10000) of student-teachers of colleges of education with* respect to academic achievement.

8. **Hypothesis:** There is no significant difference between age groups (below 25 years, 26-30 years and above 30 years) of student-teachers of colleges of education with respect to emotional intelligence and its dimensions (that is self –awareness, empathy, self-motivation, emotional stability, managing relations, integrity, self development, value orientation, commitment and altruistic behaviour).

9. **Hypothesis:** There is no significant difference between male and female student-teachers of colleges of education with respect to emotional intelligence and its dimensions (that is self –awareness, empathy, self-motivation, emotional stability, managing relations, integrity, self development, value orientation, commitment and altruistic behaviour).

10. **Hypothesis:** There is no significant difference between graduate and postgraduate student-teachers of colleges of education with respect to emotional intelligence and its dimensions (that is self –awareness, empathy, self-motivation, emotional stability,

managing relations, integrity, self development, value orientation, commitment and altruistic behaviour).

11. **Hypothesis:** There is no significant difference between Arts and Science student-teachers of colleges of education with respect to emotional intelligence and its dimensions (that is self –awareness, empathy, self-motivation, emotional stability, managing relations, integrity, self development, value orientation, commitment and altruistic behaviour).

12. **Hypothesis:** There is no significant difference between urban and rural student-teachers of colleges of education with respect to emotional intelligence and its dimensions (that is self –awareness, empathy, self-motivation, emotional stability, managing relations, integrity, self development, value orientation, commitment and altruistic behaviour).

13. **Hypothesis:** There is no significant difference between student-teachers of aided, unaided and Government colleges of education with respect to emotional intelligence and its dimensions (that is self –awareness, empathy, self-motivation, emotional stability, managing relations, integrity, self development, value orientation, commitment and altruistic behaviour).

14. **Hypothesis:** There is no significant difference between parents income (below *₹.2000, ₹.2001-5000, ₹.5001-10000 and above ₹.10000) of student-teachers of colleges of education with respect* to emotional intelligence and its dimensions (that is self –awareness, empathy, self-motivation, emotional stability, managing relations, integrity, self development, value orientation, commitment and altruistic behaviour).

15. **Hypothesis:** There is no significant difference between age groups (below 25 years, 26-30 years and above 30 years) of student-teachers of colleges of education with respect to self-esteem.

16. **Hypothesis:** There is no significant difference between male and female student-teachers of colleges of education with respect to self-esteem.

17. **Hypothesis:** There is no significant difference between graduate and postgraduate student-teachers of colleges of education with respect to self-esteem.

18. **Hypothesis:** There is no significant difference between Arts and Science discipline student-teachers of colleges of education with respect to self- esteem.

19. **Hypothesis:** There is no significant difference between student-teachers of urban and rural colleges of education with respect to self esteem.

20. **Hypothesis:** There is no significant difference between student-teachers of aided, unaided and Government colleges of education with respect to self-esteem.

21. **Hypothesis:** There is no significant difference between parents income (below *₹.2000, ₹.2001-5000, ₹.5001-10000 and above ₹.10000) of student-teachers of colleges of education with respect* to self-esteem.

22. **Hypothesis:** There is no significant difference between age groups (below 25 years, 26-30 years and above 30 years) of student-teachers of colleges of education with respect to personal effectiveness and its dimensions (that is self-awareness, openness, communication, time orientation and perceptiveness).

23. **Hypothesis:** There is no significant difference between male and female student-teachers of colleges of education with respect to personal effectiveness and its dimensions (that is self-awareness, openness, communication, time orientation and perceptiveness).

24. **Hypothesis:** There is no significant difference between graduate and postgraduate student-teachers of colleges of education with respect to personal effectiveness and its dimensions (that is self-awareness, openness, communication, time orientation and perceptiveness).

25. **Hypothesis:** There is no significant difference between Arts and Science student-teachers of colleges of education with respect to personal effectiveness and its dimensions (that is self-awareness, openness, communication, time orientation and perceptiveness).

26. **Hypothesis:** There is no significant difference between urban and rural student-teachers of colleges of education with respect to personal effectiveness and its dimensions ((that is self-awareness, openness, communication, time orientation and perceptiveness.

27. **Hypothesis:** There is no significant difference between student-teachers of aided, unaided and Government colleges of education with respect to personal effectiveness and its dimensions (that is self-awareness, openness, communication, time orientation and perceptiveness).

28. **Hypothesis:** There is no significant difference between income groups of parents (below ₹.2000, ₹.2001-5000, ₹.5001-10000 and above ₹.10000) of student-teachers of colleges of education with respect to personal effectiveness and its dimensions (that is self-awareness, openness, communication, time orientation and perceptiveness).

29. **Hypothesis:** There is no significant relationship between emotional intelligence and its dimensions (that is self–awareness, empathy, self-motivation, emotional stability, managing relations, integrity, self development, value orientation, commitment and altruistic behaviour) and academic achievement of student-teachers of colleges of education.

30. **Hypothesis:** There is no significant relationship between emotional intelligence and its dimensions (that is self–awareness, empathy, self-motivation, emotional stability, managing relations, integrity, self development, value orientation, commitment and altruistic behaviour) and academic achievement of student-teachers of colleges of education in different age groups.

31. **Hypothesis:** There is no significant relationship between emotional intelligence and its dimensions (that is self–awareness, empathy, self-motivation, emotional stability, managing relations, integrity, self development, value orientation, commitment and altruistic behaviour) and academic achievement of male and female student-teachers of colleges of education.

32. **Hypothesis:** There is no significant relationship between emotional intelligence and its dimensions (that is self–awareness, empathy, self-motivation, emotional stability, managing relations, integrity, self development, value orientation, commitment and altruistic behaviour) and academic achievement of graduate and postgraduate student-teachers of colleges of education.

33. **Hypothesis:** There is no significant relationship between emotional intelligence and its dimensions (that is self–awareness, empathy, self-motivation, emotional stability, managing relations, integrity, self development, value orientation, commitment and

altruistic behaviour) and academic achievement of arts and science student-teachers of colleges of education.

34. **Hypothesis:** There is no significant relationship between emotional intelligence and its dimensions (that is self–awareness, empathy, self-motivation, emotional stability, managing relations, integrity, self development, value orientation, commitment and altruistic behaviour) and academic achievement of urban and student-teachers of rural colleges of education.

35. **Hypothesis:** There is no significant relationship between emotional intelligence and its dimensions (that is self–awareness, empathy, self-motivation, emotional stability, managing relations, integrity, self development, value orientation, commitment and altruistic behaviour) and academic achievement of student-teachers of aided, unaided and Government colleges of education.

36. **Hypothesis:** There is no significant relationship between self esteem and academic achievement of student-teachers of colleges of education by age groups, gender, qualification, discipline, location, and types of management.

37. **Hypothesis**: There is no significant relationship between personal effectiveness and its dimensions (that is self–awareness, openness, communication, time orientation and perceptiveness) and academic achievement of student-teachers of colleges of education.

38. **Hypothesis:** There is no significant relationship between personal effectiveness and its dimensions (that is self–awareness, openness, communication, time orientation and perceptiveness) and academic achievement of student-teachers of colleges of education of different age groups.

39. **Hypothesis:** There is no significant relationship between personal effectiveness and its dimensions (that is self–awareness, openness, communication, time orientation and perceptiveness) and academic achievement of male and female student-teachers of colleges of education.

40. **Hypothesis:** There is no significant relationship between personal effectiveness and its dimensions (that is self–awareness, openness, communication, time orientation and perceptiveness) and academic achievement of graduate and postgraduate student-teachers of colleges of education.

41. **Hypothesis:** There is no significant relationship between personal effectiveness and its dimensions (that is self–awareness, openness, communication, time orientation and perceptiveness) and academic achievement of arts and science student-teachers of colleges of education.

42. **Hypothesis:** There is no significant relationship between personal effectiveness and its dimensions (that is self–awareness, openness, communication, time orientation and perceptiveness) and academic achievement of urban and rural student-teachers of colleges of education.

43. **Hypothesis:** There is no significant relationship between personal effectiveness and its dimensions (that is self –awareness, openness, communication, time orientation and perceptiveness) and academic achievement of student-teachers of aided, unaided and Government colleges of education.

44. **Hypothesis:** Emotional intelligence, self-esteem and personal effectiveness would not be significant predictors of academic achievement of student-teachers of colleges of education

45. **Hypothesis:** Emotional intelligence, self-esteem and personal effectiveness would not be significant predictors of academic achievement of below 25 years of age group student-teachers of colleges of education.

46. **Hypothesis:** Emotional intelligence, self-esteem and personal effectiveness would not be significant predictors of academic achievement of 26-30 years of age group student-teachers of colleges of education.

47. **Hypothesis:** Emotional intelligence, self-esteem and personal effectiveness would not be significant predictors of academic achievement of above 30 years of age group student-teachers of colleges of education.

48. **Hypothesis:** Emotional intelligence, self-esteem and personal effectiveness would not be significant predictors of academic achievement of male student-teachers of colleges of education.

49. **Hypothesis:** Emotional intelligence, self-esteem and personal effectiveness would not be significant predictors of academic achievement of female student-teachers of colleges of education

50. **Hypothesis:** Emotional intelligence, self-esteem and personal effectiveness would not be significant predictors of academic achievement of graduate student-teachers of colleges of education.

51. **Hypothesis:** Emotional intelligence, self-esteem and personal effectiveness would not be significant predictors of academic achievement of Postgraduate student-teachers of colleges of education.

52. **Hypothesis:** Emotional intelligence, self-esteem and personal effectiveness would not be significant predictors of academic achievement of Arts student-teachers of colleges of education.

53. **Hypothesis:** Emotional intelligence, self-esteem and personal effectiveness would not be significant predictors of academic achievement of Science student-teachers of colleges of education.

54. **Hypothesis:** Emotional intelligence, self-esteem and personal effectiveness would not be significant predictors of academic achievement of student-teachers of urban colleges of education.

55. **Hypothesis:** Emotional intelligence, self-esteem and personal effectiveness would not be significant predictors of academic achievement of student-teachers of rural colleges of education.

56. **Hypothesis:** Emotional intelligence, self-esteem and personal effectiveness would not be significant predictors of academic achievement of student-teachers of aided colleges of education

57. **Hypothesis:** Emotional intelligence, self-esteem and personal effectiveness would not be significant predictors of academic achievement of student-teachers of unaided colleges of education.

58. **Hypothesis:** Emotional intelligence, self-esteem and personal effectiveness would not be significant predictors of academic achievement of student-teachers of Government colleges of education.

59. **Hypothesis**: There are no significant direct and indirect effects of emotional intelligence, self-esteem and personal effectiveness on academic achievement of student-teachers of colleges of education.

4.5 Tools Used

The research tools that were used for the present study are described in detail in the following pages.

Table-4.1: Tools Used for Collection of Data

S.No.	Research Tools	Developed and Validated by	Factors Assessed
1.	Emotional Intelligence Scale	Anukool Hyde, Sanjyot Pethe and Upinder Dhar (2002)	Emotional Intelligence and its dimensions
2.	Self-Esteem Scale	A.H. Eagly (1996)	Self-Esteem
3.	Personal Effectiveness Scale	Investigator	Personal Effectiveness and its dimensions
4.	Achievement Test	Investigator	Academic Achievement of Students

4.5.1 Emotional Intelligence Scale

To collect the relevant data, the Emotional Intelligence Scale Anukool Hyde, Sanjyot Dethe and Upinder Dhar (2002) is adopted. This scale consists of 34 items. All the items are positive. Each item has five alternatives namely 'strongly agree, 'agree', 'uncertain', 'disagree' and 'strongly disagree'. The details regarding these dimensions and number of items under each are given in table 4.2.

Table-4.2: Dimension Wise Distribution of Statements of the Emotional Intelligence Scale

Sl.No.	Dimensions	Item No.	Total No. of Items
1	Self-awareness	6, 12, 1, 29	4
2	Empathy	9, 10, 15, 20 and 25	5
3	Self-motivation	2, 4, 7, 8, 31 and 34	6
4	Emotional stability	14, 19, 26 and 28	4
5	Managing relations	1, 5, 11 and 17	4
6	Integrity	16, 27 and 32	3
7	Self-development	30 and 33	2
8	Value orientation	21 and 22	2
9	Commitment	3 and 13	2

10	Altruistic behaviour	3 and 13	2
		Total	**34**

Scoring

The tool consists of 34 items, which reflects the emotional intelligence of student teachers. The respondents were asked to respond each statement and not to leave any statement unanswered. Each item is to be answered by anyone of the response strongly agree, agree, uncertain, disagree and 'strongly disagree'. The scoring was done as 5, 4, 3, 2, and 1 for strongly agree, agree, uncertain, disagree and strongly disagree.

Table-4.3: Description of Emotional Intelligence Scale

Sl.No.	Dimensions	Item Numbers
1	Self-awareness	1 – 4
2	Empathy	5 – 9
3	Self-motivation	10 – 15
4	Emotional stability	16 – 19
5	Managing relations	20 – 23
6	Integrity	24 – 26
7	Self-development	27 – 28
8	Value orientation	29 – 30
9	Commitment	31 – 32
10	Altruistic behaviour	33 – 34
	Total	**34**

Establishing Validity

To establish validity, the tool was given to the Professors of Psychology. The experts gave opinion about the content of the tool. Their suggestions were incorporated. Few statements were modified and refined. Thus, the content validity of the tool was established.

Validity of the Scale

The validity co-efficient was found to be 0.85. And this is found to be significant at 0.01 levels. The scale was therefore found to be a suitable one and hence it has been used in the present investigation.

Establishing Reliability

The investigator has used test-retest method in establishing reliability of the tool. The tool has been administered to student teachers

of Rani Channamma University, Belgaum. The product moment correlation co-efficient was computed. It was 0.72. The reliability of the tool was found to be high.

4.5.2 Self-Esteem Scale

To measure the self-esteem, the researcher used a self-esteem measuring tool developed by A. H. Eagly (1996), adopted from J. R. Robinson and P. R. Shaver (1991). It is based on Likert method of summated ratings. The scale consists of 20 items with five alternative responses namely, very often, fairly often, sometimes, once in a great while and practically never.

Scoring

The scoring key valuing the responses is as follows; for ten items namely 1, 2, 6, 8, 9, 10, 15, 16, 17 and 18 the scores were equivalent to 1,2,3,4 and 5 for options very often, fairly often, sometimes, once in a while and practically never respectively. For the other ten items namely 3, 4, 5, 7, 11, 12, 13, 14, 19 and 20 the scores were reversed.

Table-4.4: Scoring Key for Positive and Negative Items

Items	Very often	Fairly often	Some times	Once in a great while	Practically never
Positive items	5	4	3	2	1
Negative items	1	2	3	4	5

Positive Statements	Negative Statements
3, 4, 5 7, 11, 12, 13, 14, 19, 20	1, 2, 6, 8, 9, 10, 15, 16, 17, 18

Validity of the Scale

The validity co-efficient of the scale was found to be 0.87 at 0.01 level of significance. The scale was therefore found to be a suitable one and hence, it has been used in the present investigation.

Establishing Reliability

The investigator used split half method to establish reliability of the tool. The test was divided into two equivalent 'halves' and was administered to B.Ed. teacher trainees of Rani Channamma University, Belgaum and correlation was found for these 'halves'. The reliability coefficient was determined by adopting split-half method. The correlation of self-esteem scale through split-half method was found to be 0.76 at 0.01 level. The reliability of the scale was thus found to be high.

Table-4.5: Reliability (Split-half method) of the Self-esteem Scale

Method	Reliability	Result
Split-half	.76	Significant (0.01 level)

From the result, it is concluded that self-esteem scale is highly reliable.

4.5.3 Personal Effectiveness Scale

The investigator has constructed personal effectiveness scale to measure the personal effectiveness of student teachers of colleges of education by referring books, journals and internet. After a careful analysis of the factors, the investigator decided to study the personal effectiveness with five dimensions, namely (i) self disclosure (ii) openness (iii) (iii)communication (iv) time orientation(v)perceptiveness

Preparation of the Draft Tool

Based on the different dimensions of personal effectiveness, the investigator prepared a draft tool in the form of statements. The investigator constructed 58 items. The tool consisted of five major dimensions namely, self-awareness, openness, communication, time orientation and perceptiveness. Each item had to be answered with five options, namely, strongly agree, agree, undecided, disagree and strongly disagree.

Table-4.6: Dimension-wise Distribution of Statements

Sl.No.	Dimensions	Number of statements

1	Self-awareness	9
2	Openness	12
3	Communication	11
4	Time orientation	15
5	Perceptiveness	11
	Total	58

Tryout of Personal Effectiveness Scale

The tool consisted of 58 items, which reflects the personal effectiveness of the student teachers of colleges of education. The researcher personally collected data from five colleges of education of Belgaum city. The tool was administered to the student teachers of colleges of education. From each college 10 student teachers were selected and in all 50 student teachers were administered the tool. The confidentiality of the responses was assured. Each item was to be answered by selecting any one of the five options, namely, strongly agree, agree, undecided, disagree and strongly disagree. It is decided to give scores of 5, 4, 3, 2, 1 for positive items 1, 2, 3, 4, 5 for negative items. The total score of the respondents was obtained by adding the scores given for each item in the scale.

Item Correlation

The refinement of the tool, item validity was calculated. This is also known as internal validity of an instrument. This refers to the interconnection of different items in the same tool. This is known as item correlation. The inter item correlation values were worked out for each item and are given in the table below:

Table-4.7: Item Correlation of the Draft Personal Effectiveness Scale

Questions	Item total correlation	Alpha value
1	**-0.0486**	**0.8236**
2	0.1551	0.8193
3	**0.0696**	**0.8222**
4	0.5075	0.8116

Questions	Item total correlation	Alpha value
5	**-0.0782**	**0.8245**
6	0.4105	0.8129
7	0.4379	0.8125
8	0.2515	0.8169
9	**0.0873**	**0.8213**
10	0.6504	0.8091
11	**-0.2364**	**0.8291**
12	0.1820	0.8189
13	0.3231	0.8150
14	0.3169	0.8154
15	0.5941	0.8070
16	0.2013	0.8181
17	0.4214	0.8134
18	0.4027	0.8144
19	0.3877	0.8152
20	0.2096	0.8184
Questions	**Item total correlation**	**Alpha value**
21	**-0.0284**	**0.8223**
22	0.5251	0.8100
23	0.2547	0.8169
24	0.4861	0.8118
25	0.5263	0.8092
26	**0.1167**	**0.8201**
27	0.1880	0.8182
28	0.1859	0.8182
29	0.2822	0.8161
30	0.2240	0.8175
31	0.3231	0.8150
32	**-0.2791**	**0.8287**
33	0.4365	0.8115
34	**-0.0782**	**0.8237**
35	0.4861	0.8118
36	0.4214	0.8134
37	0.2313	0.8173
38	0.3335	0.8163
39	0.3888	0.8141
40	0.5147	0.8121
41	0.2547	0.8169
42	0.1761	0.8187
43	0.3231	0.8150

44	0.5297	0.8108
45	0.3950	0.8132
46	0.4368	0.8118
47	0.3948	0.8131
48	**0.0605**	**0.8210**
49	0.3211	0.8151
50	0.2655	0.8168
51	0.2159	0.8198
52	**0.2019**	**0.8158**
53	**-0.0745**	**0.8235**
54	**0.0696**	**0.8222**
55	0.4594	0.8125
56	0.5463	0.8119
57	**0.0196**	**0.8214**
58	0.2942	0.8158

The items having low item total correlation were eliminated. Therefore, out of 58 items, 14 items were deleted. The remaining 44 items were retained in the final form of the tool.

The final personal effectiveness scale has five dimensions namely, (i) self awareness (ii) openness (iii) communication (iv) time orientation and (v) perceptiveness. The dimension-wise distribution of statements is given in the following table.

Table-4.8: Dimension-wise Distribution of Statements of the Personal Effectiveness Scale

Sl. No.	Dimensions	Condition	Item No.	Total No. of Items	
1	Self-awareness	Positive	15, 28, 40, 43	4	7
		Negative	3, 22, 38	3	
2	Openness	Positive	11, 14, 21, 32, 42, 44	6	9
		Negative	9, 4, 34	3	
3	Communication	Positive	2, 7,18, 24, 30, 39	6	10
		Negative	5, 10, 19, 37	4	
4	Time orientation	Positive	1, 12, 29, 31, 35	5	9
		Negative	16, 25, 27, 33	4	
5	Perceptiveness	Positive	6, 8, 13, 17, 20, 26, 36, 41	8	9
		Negative	23	1	
			Total Items	**44**	

Minimum score: 44

Maximum score: 220

Scoring

The personal effectiveness scale comprises of 44 items distributed among each dimension. It is having a 5 point scale. All the selected 50 student teachers were again asked to indicate their response to each of the 44 statements on a 5-point scale. They were scored as given below:

Table-4.9: Scoring of Personal Effectiveness Scale

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Positive	5	4	3	2	1
Negative	1	2	3	4	5

Content Validity

Content validity is the extent to which a measuring instrument provides adequate coverage of the topic under study. To establish the content validity the prepared draft tool was given to experts in the field of education, to estimate the worth of the items. Considering their comments and suggestions, some irrelevant items was deleted and some items were restructured and refined. Thus the content validity of the tool was established.

Establishing Reliability and Validity

The reliability of the personal effectiveness scale was computed using split-half method of reliability. The overall reliability of the scale was 0.7331, the overall validity was established by square root of reliability that is $\sqrt{0.7331} = 0.8562$.

4.5.4 Achievement Test to Measure Academic Achievement

To test the students' performance, the achievement test was constructed. Achievement test designed to measure a person's knowledge, skills, understanding, etc., in a given taught in school, for example, a Mathematics test or an English test (Good, 1973).

It refers to test designed to measure the effects of specific teaching or training in an area of the curriculum (Taneja, 1998).

Multiple Choice Items

There are number of ways through which one can test the students' achievement. They are free response tests and fixed response tests. The investigator had developed the fixed response tests. As the fixed response tests are applicable to a wide range of subject matter and

easy for objective scoring, the investigator found it useful. An example for fixed response test is multiple choice tests. Multiple choice items have the greatest potential for measuring the objectives of learning.

Preparation of the Test

Multiple choice items were prepared by the investigator covering the five (compulsory) core papers of first semester of B.Ed. course curriculum prescribed by the Rani Channamma University, Belgaum namely, Philosophical and Sociological Foundations of Education; Psychology of Teaching and Learning; Educational Technology; Skills and Strategies of Teaching and Information and Communication Technology in Education. These five papers are compulsory core papers for the B.Ed. first semester. Each item was given four response options, out of which one was the test answer and the others were distracters. The draft test consisted of 50 items.

Steps followed in Construction of an Achievement Test

The researcher has followed the steps as laid down by Taxler and North (1957) in the construction of an achievement test. The suggested steps are as follows:

- Survey of the aims and objectives and the subject for which the test is made, through textbooks and courses of study (syllabus).

- Decision was taken concerning the weightages to the different objectives.

- Preparation of the test items based on the various objectives was done.

- Setting up of a trial form of the test including at least 50% more items that were used in the final form.

- Submission of the trial form to specialists for criticism was done.

- Administration of the trial form to a group of pupils who were at the level for which the test was planned.

- Statistical analysis of the items of difficulty and discrimination.

- Comments of the specialists (experts) on the trial form items were taken into consideration. Selection of the good items for the final form of the test was done on the basis of the item analysis.

- Establishment of norms for various ages, grades or years of study.

- Formulating of precise directions for administering and scoring so that it would be possible for all persons giving the test and scoring it to obtain comparable results.

- Collection and reporting of complete statistical data on the reliability and validity of the test.

The following were the stages and steps involved in the process of construction of Achievement Test.

Stage -I
    Step-1 Preparation of Blue –Print, and
    Step-2 Pooling of Test Items
Stage –II
    Step-3 Item –Analysis in term of
        i. Difficulty Index, and
        ii. Item-Validity

Stage-III
    Step -4 Finalization of items based on Item Analysis

Stage-IV

    Step-5 Evaluation of the test in terms of
        i. Reliability, and
        ii. Validity
The above mentioned steps are described below in detail.
Stage-I

Step-I: Preparation of Blue -Print

A two dimensional blue-print showing coverage of content and instructional objectives and types of items was prepared by referring to

B.Ed. curriculum, and items were finalized in consultation with the experts. The blue-print of the test is given in the following table:

Table -4.10: Blue Print of the Achievement Test

Core Papers	Objectives				
	Knowledge	Understanding	Application	Skill	Total
I Philosophical and Sociological Foundations of Education	1, 2, 24	10	16	0	5
II Psychology of Teaching and Learning	3, 17	7, 20	11	0	5
III Skills and Strategies of Teaching	14	13	8	0	3
IV Educational Technology	18	22	4	0	3
V Information and Communication Technology in Education (I.C.T.E.)	5, 12, 21, 25	6, 9, 23	15, 19	0	9
Grand Total	11	8	6	0	25

Defining the Objectives of the Test

The first step involved in the construction of the test is to prepare a specialization table. This includes the development of a table which depicts consideration of objectives of different units of the course. The basic procedure is to set up a two dimensional chart .One axis

represented the subject matter or content and on the other, the types of behaviour that the test intends to measure. The utilization of two dimensional chart helps to ensure adequate coverage of the area in the test with reference to both specific content and the types of behaviour expected out of teaching learning process.

Initially, 50 multiple choice items were constructed. The items were then presented to a group of experts consisting of research workers and experienced teachers, subject experts, educationists.

The suggestions given by experts are made use of in refining the items. Based on the discussions with the experts, the researcher selected 50 items for tryout.

Step-2: Pooling of Test Items

Keeping in view the requirements of the blue print, 50 items were pooled for final test. These items were selected from B.Ed. curriculum prescribed by Rani Channamma University, Belgaum for B.Ed. student teachers.

Stage - II
Step- 3 Item Analysis
i. Difficulty index

After administering the test to 60 student teachers of K.S.R. College of Education, Belgaum and on scoring them, the responses were subjected to item analysis.

After the valuation, the individual total marks of all the student teachers from the highest to the lowest were arranged. The upper 27% and the lower 27% were selected. Item analysis is an important step for selecting items for final test. Item analysis is made up of two components that is difficulty index and discriminative index. Both these components enabled the investigator to select the items by calculating discriminating power and difficulty level of the items to be included in the final test. The difficulty index and the discriminative index were calculated by the formula given below.

$$\text{Difficulty Index} = (R_U + R_L)/ T$$

Where,

R_U : Number of students who answered correctly in the upper group.

R_L : Number of students who answered correctly in the lower group.

T : Total number of students in both the groups.

The discriminative index of a test item is determined by the extent to which the given item is discriminated among examinees who differ sharply in the function measured by the test as a whole. The discriminative index was calculated by using the formula:

$$\text{Index of discrimination} = (R_U - R_L)/ (T/2)$$

Where,

R_U : Number of students who answered correctly in the upper group.

R_L : Number of students who answered correctly in the lower group.

T : Total number of students in both the groups.

A test item whose discriminative index was 0.2 or more was accepted.

A discriminating index is usually expressed as a decimal. If it has a positive value, the item was positive discrimination. This means that a large proportion of the more knowledgeable students than poor students got the item correct. If the value is zero the item has zero discrimination. This can occur because the item is too easy or too hard or because it is ambiguous.

If more low achievers than high achievers get the item correct, one would obtain a negative discrimination. With a small number of students, this may be a chance result but it may indicate that the item is ambiguous or miskeyed.

Discriminating Power		Difficulty level	
0.4 & above	Excellent item	Between 0.4 & 0.6	Average Difficult
Between 0.4 & 0.3	Good	Between 0.2 & 0.4	Difficulty item
Between 0.2 & 0.3	Average item	Between 0.6 & 0.8	Easy item
Between 0.2 & 0.1	Requires improvement	Between 0.8 & 1.0	Very easy item
Less than 0.1	Item to be dropped or condemned	Between 0. & 0.2	Very difficulty item

Table-4.11: Item Analysis of Achievement Test

Items	Index of difficulty	Index of discrimination	Selected(s)
1	0.60	0.38	S
2	0.60	0.40	S
3	0.60	0.30	S
4	0.30	0.40	S
5	0.70	0.40	S
6	0.30	0.35	S
7	0.45	0.40	S
8	0.45	0.50	S
9	0.70	0.39	S
10	0.65	0.39	S
11	0.60	0.30	S
12	0.50	0.50	S
13	0.60	0.50	S
14	0.60	0.40	S
15	0.65	0.50	S
16	0.60	0.55	S
17	0.60	0.50	S

Items	Index of difficulty	Index of discrimination	Selected(s)
18	0.30	0.30	S
19	0.70	0.60	S
20	0.60	0.50	S
21	0.45	0.60	S
22	0.65	0.30	S
23	0.60	0.50	S
24	0.60	0.50	S
25	0.70	0.60	S

Scoring

Finally the test consisted of 25 items. Each item is given with four alternatives, one is the correct answer and the other three are distracters. The total score will be from 0 to 25. The highest score refers to the highest achievement and the lowest score signifies the lowest achievement.

Table-4.12: Description of Academic Achievement Test

Sl.No.	Components (Core papers)	Item Numbers
1	Philosophical and Sociological Foundations of Education	1, 2, 10, 16, 24
2	Psychology of Teaching and Learning	3, 7, 17, 20, 11
3	Skills and Strategies of Teaching	8, 13, 14
4	Educational Technology	4, 18, 22
5	Information and Communication Technology in Education	5, 6, 9, 12, 15, 19, 21, 23, 25

Content Validity

The draft tool was given to senior teacher educators who handle the core papers for their comments and suggestions. Some items were reformulated and refined on the basis of the suggestions given by them. The distracters also have been taken care. Some modifications were

done in the test on the basis of their comments. Thus the content validity of the tool was established.

Construct Validity

The test was also restructured on the basis of various items that test the objectives proposed to test. Thus construct validity was established. The details of the reliability and validity of the test is given in the following table.

Establishing Validity and Reliability

The reliability was the achievement test was computed using split-half method of reliability. The overall reliability of the test was 0.8449, the overall validity was found to be 0.92. Hence, the test was found to be suitable to be used in the present investigation.

Table-4.13: Reliability Values

Summary	Values
Cronbach alpha, full scale	0.7519
Cronbach alpha, first half	0.6506
Cronbach alpha, second half	0.4338
Corr. 1st & 2nd half	0.7315
Split-half reliability	0.8449
Guttmann split-half	0.8284
Validity	0.9192

4.6 Area of the Study

The area of the study consists of three districts in the northern most part of Karnataka namely, Belgaum, Bagalkot and Bijapur.

4.7 Population of the Study

In the words of Gupta (1994) "A population or universe is objects whether animate or inanimate. It consists of all set of individuals or their attributes that can be described as having a unique pattern or characteristics or qualities".

The population of the study consists of the B.Ed. college student teachers in the northern districts of Karnataka state, namely, Belgaum, Bagalkot and Bijapur.

Table-4.14: District-wise Distribution of the Sample

Sl.No.	Name of the District	Sample
1.	Belgaum	350
2.	Bagalkot	280
3.	Bijapur	270
	Total	**900**

It is inferred from the above table that B.Ed. student teachers are randomly selected from the northern districts of the Karnataka state.

4.8 Sample of the Study

According to Gupta (1994) "A sample consists of a small collection from some large aggregate about which we wish information".

The investigator has selected 900 student teachers studying in colleges of education in the northern districts of Karnataka state namely, Belgaum, Bagalkot and Bijapur these colleges of education are affiliated to Rani Channamma University, Belgaum using random sampling technique.

Table-4.15: Age-wise Distribution of the Sample

Age	Number of students	Percentage
Below 25 years	823	91.44
26-30 years	54	6.00
Above 30 years	23	2.56
Total	**900**	**100**

It is inferred from the above table that the sample consists of 91.44% of below 25 years age, 6% of 26-30 years age and 2.56% of above 31 years of age group of B.Ed. student teachers.

Table-4.16: Gender-wise Distribution of the Sample

Gender	Number of students	Percentage
Male	200	22.22
Female	700	77.78
Total	**900**	**100**

It is inferred from the above table that the sample consists of 22.22% of male and 77.78% of female B.Ed. student teachers.

Table-4.17: Qualification-wise Distribution of the Sample

Qualification	Number of students	Percentage
Graduates	595	66.11
Postgraduates	305	33.89
Total	**900**	**100**

It is inferred from the above table that the sample consists of 66.11% of Undergraduate qualified student teachers and 33.89% of Postgraduate qualified student teachers of colleges of education.

Tabl-4.18: Discipline-wise Distribution of the Sample

Discipline	Number of students	Percentage
Arts	320	35.56
Science	580	64.44
Total	**900**	**100**

It is inferred from the above table that the sample consists of 35.56% student teachers who are Arts discipline and 65.44% student teachers who are Science discipline of colleges of education.

Tabl-4.19: Location-wise Distribution of the Sample

Location of the College	Number of students	Percentage
Urban	612	68.00

Rural	288	32.00
Total	**900**	**100**

It is inferred from the above table that the sample consists of 68% student teachers of urban colleges and 32% of student teachers of rural colleges of education.

Tabl-4.20: Type of Management-wise Distribution of the Sample

Type of Management	Number of students	Percentage
Aided	258	28.67
Un-aided	490	54.44
Government	152	16.89
Total	**900**	**100**

It is inferred from the above table that the sample consists of 28.67% student teachers who are studying in aided colleges of education, 54.44% of students teachers are studying in un-aided type of management colleges and rest of the 16.89% of student teachers are studying in Government colleges of education.

Table-4.21: Parents Income-wise Distribution of the Sample

Parents Income Group	Number of students	Percentage
Rs. Below 2000	108	12.00
Rs. 2001-5000	346	38.44
Rs. 5001-10000	271	30.11
Rs. Above 10000	175	19.44
Total	**900**	**100**

It is inferred from the above table that the sample consists of 12% of below Rs. 2000/- parents income group, 38.44% of Rs. 2001-5000,

30.11%, Rs. 5001-10000 and 19.44% of Rs. above 10,000 parents income groups of student teachers of colleges of education.

4.9 Data Collection

The investigator personally collected the data from 900 student teachers of colleges of education in three northern districts of Karnataka state namely Belgaum, Bagalkot and Bijapur affiliated to the Rani Channamma University, Belgaum. Student teachers were personally administered the tools. Clear-cut instructions were given to fill-up the responses to the items in the tools. The filled in proformas and tools were collected. The confidentiality of the responses was assured. The collected data was systematically pooled for analyses.

4.10 Statistical Techniques Used for Analysis of the Data

The following statistical techniques were used for analyzing the data as per the objectives of the study.

- (i)   Descriptive analysis
- (ii)   Differential analysis
- (iii)   Correlation analysis
- (iv)   Regression analysis
- (v)   Path analysis

4.11 Conclusion

The methodology adopted is described in this chapter. The data collected from the teacher educators of colleges of education are analyzed using appropriate statistical techniques for description and inference. The details of the data analyses are presented in the next chapter.