CHAPTER VI

SUMMARY AND CONCLUSIONS

6.1 SUMMARY

Education is an essential human activity. It is as old as the human race. Without education, man is a splendid slave and a reasonable savage. It is closely bound with the intellectual, economic, cultural, emotional and social life of the human race. It is through education that man has improved his environments and consequently himself. He has never remained constant with his lot and has been striving to improve upon his developing civilization. Education has made him more logical and scientific in attitude.

The world of today is much different from the world of yesterday. Science has revolutionised not only our mode of life but also our outlook on life. It is a mighty force in the advancement of civilization. The contributions of science to civilized living and the possibilities of furthering human welfare have far-reaching significance for every individual. Problems of health, recreation, economics, communication, shelter, conservation of natural resources, production, transportation and consumptions of goods and even education requires the scientific knowledge and scientific methods to be used in their solution. The scientific outlook has helped mankind to move out of dogmatic prepossessions, out moded customs and beliefs, idle
superstitions and erroneous conceptions. In fact, every realm of human activity is profoundly influenced by science. Hence some knowledge of science and scientific method is necessary.

Science is made a compulsory subject upto 10+ level due to its multifarious advantages. To teach such a useful subject lively and meaningfully, we need efficient and effective science teachers. The quality of science teaching mainly depends on mostly the quality of its teachers and to some extent on the facilities available and on the content.

It is well said, "As is the school, so is the nation, as is the teacher, so is the school." Teaching profession is the mother of all professions. A teacher, may he be of any level, prepares the future of citizens, professionals, technicians, skilled workers, medical professionals, engineers, artists and so on. He is everywhere in the educational process. His philosophy, his methods, his knowledge, his integrity and, above all, his character are the backbone of the future progress of society and nation. His inefficiency can result in the downfall of the nation. The more and more elevated his image would be, more and more the nation and society will attain the achievements and success in every field of national life and that's why the teacher is vital to any nation and its educational system. No system of education can ever rise higher than the quality of its teachers. If education is at
the root of all progress of every country the teacher is at the root of education.

It is generally agreed that the goodness of an educational programme is determined to a large extent by the teacher. Therefore the identification of qualified and able teaching personnel remains one of the most important problems in any educational system of the world. If competent teachers can be obtained there is a likelihood of attaining desirable educational outcomes. Schools may have excellent material resources in the form of equipment, building and text books and the curriculum may be quite appropriate and adopted to community requirements, but if the teachers are unskilled, untrained and indifferent to their responsibilities, the whole programme is likely to be ineffective and futile.

Science teachers must be the exemplars of the philosophy and critical method of inquiry of science for their students. The job of the science teacher is, therefore, to help his students learn from direct experience, vicarious experience, and from written and oral expression. For certain purposes field trips in which objects, phenomena and events can be observed in their natural settings are necessary for real and durable learnings. Specimens, models, motion pictures, flat pictures, charts, maps, graphs, lantern slides, film strips, recordings, radio and T.V. are some of the supplementary factors which contribute to effective science teaching.
Now the question arises as to what type of science teachers we need? What salient features are needed to become a good science teacher? How to get a good science teacher? From where to get a good science teacher? All these questions confront every Nation. No nation can feel relieved any moment from this unique problem. Many efforts are made and yet everything goes on in its own way. No universal pattern could be suggested or adopted in any country so far as the training and selection of a science teacher is concerned. However, the present state of affairs is the worst of all times. Frustration is ought to come when we expect everything, from a science teacher caring little that every science teacher is human being first and a teacher afterwards. Therefore there is great need to study the most important characteristics of science teachers in relation to their teaching effectiveness and other intervening variables.

Large amount of research has been carried out with regard to teaching effectiveness but very little has been achieved. As has been pointed out by many researchers the evaluation of teacher effectiveness should be a continuous process. The search for the truth in identifying the effective science teacher along with his personal demographic and personality characteristics, in which he is more effective is undoubtedly a continuous process.
6.1.1 STATEMENT OF THE PROBLEM

The present study is stated as follows: "Impact of Certain Socio-Psychological Factors on Teaching Effectiveness of Science Teachers". This study is designed to investigate into various factors of teaching effectiveness and the influence of probable intervening variables on teaching effectiveness.

6.1.2 OBJECTIVES OF THE STUDY

The main objectives of the study are:

1. To develop an instrument for measuring teaching effectiveness.

2. To know the general level of teaching effectiveness prevailing among science teachers of secondary schools.

3. To find out the influence of personal and demographic variables on teaching effectiveness.

4. To determine the degree of relationship between the scores of teaching effectiveness and their attitude towards teaching profession.

5. To find out the relationship between the different dimensions of teaching aptitude and teaching effectiveness.

6. To identify the personality characteristics that contribute to or affect teaching effectiveness.
7. To compare the personality profiles of less and more effective science teachers.

8. To develop multiple regression equations in order to predict the teaching effectiveness with the help of different groups of independent variables.

6.1.3 HYPOTHESES

On the basis of the above objectives the following hypotheses were formulated.

1. In general secondary school science teachers are not effective in their teaching.

2. There would not be any significant influence of personal and demographic variables of the science teachers on their teaching effectiveness (each one of the variables would be considered separately).

3. There would not be any significant influence of attitude towards teaching profession of science teachers on their teaching effectiveness.

4. There would not be any significant influence of various dimensions of teaching aptitude of science teachers on their teaching effectiveness (each characteristic is tested separately).

5. The personality characteristics of the science teachers would not significantly influence their teaching effectiveness (each characteristic is tested separately).
6. The personality profiles of more effective and less effective groups of science teachers would not differ significantly.

7. There would not be any significant variation in the characteristics of more and less effective groups of science teachers.

8. None of the independent variables would turn out to be a significant predictor of the teaching effectiveness of science teachers.

6.1.4 VARIABLES STUDIED

The dependent variable in the study is teaching effectiveness of secondary school science teachers. The independent variables are broadly grouped under four categories namely (1) Personal and demographic variables, (2) Attitude towards teaching profession, (3) personality characteristics and (4) Teaching aptitude dimensions.

Teaching Effectiveness: 'Teaching effectiveness' is operationally defined as 'the degree of exhibiting different characteristics that are essential for an effective science teacher as perceived by his immediate supervisor and his students'.

(i) Personal and demographic variables. Under this category the following variables were studied:

1) Sex
2) Qualifications
5) Caste
6) Size of the family
3) Experience  
4) Marital status  
7) Type of management  
8) Place of work.

(ii) Attitude towards teaching profession

(iii) Dimensions of Teaching Aptitude Test.

Under this category the following variables were considered:

1) Cooperative attitude  
2) Kindliness  
3) Patience  
4) Wide interest  
5) Fairness  
6) Moral character  
7) Discipline  
8) Optimism  
9) Scholarly taste  
10) Enthusiasm.

(iv) Personality characteristics.

Cattell's 16 personality factors were considered to study the impact of personality of the science teachers on the dependent variable, namely teaching effectiveness.

1) Factor-A -- Reserved Vs. Outgoing  
2) Factor-B -- Less intelligent Vs. More intelligent  
3) Factor-C -- Affected by feeling Vs. Stable  
4) Factor-E -- Humble Vs. Assertive  
5) Factor-F -- Sober Vs. Happy-go-lucky  
6) Factor-G -- Expedient Vs. Conscientious  
7) Factor-H -- Shy Vs. Venturesome  
8) Factor-I -- Tough minded Vs. tender minded  
9) Factor-L -- Trusting Vs. Auspicious  
10) Factor-M -- Practical Vs. Imagination
11) Factor-N — Forthright Vs. Shrewd
12) Factor-O — Placid vs. Brooding
13) Factor-Q₁ — Conservative Vs. Experimenting
14) Factor-Q₂ — Group dependent Vs. Self-dependent
15) Factor-Q₃ — Undisciplined Vs. Controlled socially
16) Factor-Q₄ — Relaxed Vs. Tensed.

6.1.5 MEASUREMENT OF VARIABLES (TOOLS USED)

(i) Graphic rating scale:

To measure teaching effectiveness of the science teachers, a graphic rating scale was developed considering the 10 most important characteristics which contribute to teaching effectiveness according to the opinions expressed by a sample of 100 science teachers and heads of the institutions. All the characteristics presented in a Table of 10 segmented straight lines of suitable length was given on which the raters were asked to mark the position where the individual science teacher would stand on that particular characteristic. An overall rating of teaching effectiveness was also obtained from all the raters for all the science teachers included in the pilot study. To validate the rating scale internal consistency of the raters and inter-rater consistency of the ratings were established by computing coefficients of correlation between (1) average ratings on 10 characteristics and overall ratings of teaching efficiency and (2) aggregate ratings of students and heads of institutions. The test-retest reliability of the score was 0.93.
ii) Attitude towards teaching profession

To measure the attitude towards teaching profession an attitude scale was developed by following the Likert method (1932) of summated rating technique. All the principles of test construction were followed in the construction of the scale. Based on the results of pilot study conducted on 100 subjects, item analysis was carried out and discrimination values and 't' values were calculated for all the 81 statements in the pilot form of the scale. Considering these two criteria 52 statements were selected for the final form of the scale. Content validity, item validity, criterion validity and intrinsic validity of the scale were established. The split-half reliability of the scale was 0.82.

iii) Teaching Aptitude Test

To measure teaching aptitude of science teachers, a test developed by Jayaprakash and Srivastava was adopted in the present investigation. The instrument was translated carefully and both English and telugu forms of the questionnaire were given to the language experts for their comments and suggestions. Their suggestions were incorporated in the preparation of the final form in telugu version. As the instrument was a multi-dimensional test and proved its universal applicability, the instrument was considered valid. The test-retest reliability of the instrument was 0.94.
iv) Cattell's 16 P.F. Questionnaire:

The 16 personality traits were measured by adopting From-C of the 16-PF questionnaire developed by Cattell. The instrument was translated carefully and both English and Telugu forms of the questionnaire were given to English and telugu language specialists for their comments and suggestions. Their suggestions were incorporated in the preparation of the final form in telugu version. As the instrument was a culture-fair test and proved its universal applicability, the instrument was considered valid. The test-retest reliability coefficients for all the 16 traits were established.

v) Personal and demographic data-sheet:

The data regarding personal and demographic variables were obtained with the help of a personal data sheet prepared separately for the purpose.

6.1.6 SAMPLE SELECTED

A two-stage stratified random sampling technique was followed in selecting the sample for the study. The study was limited to the science teachers working in secondary schools of Chittoor District. After obtaining the list of secondary schools in Chittoor district, the schools were divided into two groups as rural and urban on the basis of the locality where they were situated. Again the stratification was made on the basis of management. By following the cluster sampling techniques, all the science
teachers handling higher classes were included in the study. Thus a total number of 200 science teachers from 106 rural and urban schools of both sexes under three managements were treated as subjects for the study. The 106 heads of the institutions and 1000 students selected at random were also acted as subjects to provide the ratings on the teaching effectiveness of 200 science teachers.

6.1.7 DATA COLLECTION

The tools attitude towards teaching profession, teaching aptitude test, 16 PF questionnaire and personal data sheet were administered on the science teachers individually after developing proper rapport with them.

The heads of the institutions were requested to rate the teaching efficiency of their science teachers after explaining them the procedure of ratings. The 10th class students thus selected were also explained carefully the procedure of making ratings with suitable illustrations and the ratings were obtained under direct supervision of the investigator. Thus the data were collected from three sources viz., science teachers, heads of the institutions and students of all the 106 schools included in the study.
The attitude scale was scored on a 5 point scale by giving weights 5 to 1 in the case of positive items and 1 to 5 in the case of negative items to the five alternatives viz., strongly agree, to strongly disagree respectively. The total score for the instrument was obtained by adding the weights on all the statements. Depending upon these scores, the science teachers were labelled as less, moderate and more favourable attitude towards their teaching profession.

The composite index of teaching effectiveness was obtained by calculating the average of the average student ratings and the ratings given by the corresponding head of the institution for each one of the science teacher.

In the teaching aptitude test every item is placed on a five point scale by giving weights of 3,2,1,2,3 for both the right and wrong items respectively. Subtract the total wrong scores from the total right scores which give the individual correct raw score in a particular sub-test. The grand total of the TAT was obtained by adding the scores of all the 10 sub-tests.

The 16 PF questionnaire was scored as per the weights provided by the author.

The information provided by the respondents in the personal data were also numerically coded to suit the computer analysis.
6.1.9 ANALYSIS

The data were carefully analysed by employing appropriate statistical techniques such as 't' test, chi-square and 'F' test etc., to know the effect of independent variables on teaching effectiveness.

The profile similarity coefficient \( r_p \) was computed to test whether there was any significant difference between less and more effective science teachers in their personality. The step-wise regression analysis was adopted to predict teaching effectiveness with the help of all the personal, demographic and psychological variables as predictors.

6.2 CONCLUSIONS

On the basis of the results obtained in the investigation the following conclusions were drawn.

1. In general the level of teaching effectiveness among the science teachers working in secondary schools was more than the average.

2. Both male and female science teachers were not significantly different in the level of their teaching effectiveness.

3. The science teachers possessing more qualifications both in general and professional fields are more effective in their level of teaching effectiveness than the less qualified.
4. Experience (length of service) of the science teachers proved to be a significant variable in influencing their teaching effectiveness. The middle group with moderate experience was significantly more effective than the other two groups in their teaching effectiveness.

5. The marital status of the science teachers did not influence their level of teaching effectiveness.

6. Science teachers belonging to backward communities were proved to be more effective than the science teachers belonging to either forward communities or scheduled communities, but could not reach the required level of significance.

7. Family size was found to be a significant variable in influencing the teaching effectiveness of science teachers. The more the size of the family the less was the teaching effectiveness and vice versa.

8. Science teachers working in the schools under private management appeared to be more effective in their teaching than the science teachers working in schools under the managements of Government and local bodies although it was not significant.

9. The place of work (either rural or urban) could not influence the level of teaching effectiveness of science teachers.
Thus, among the eight personal and demographic variables sex, marital status, locality, community and management under which they are working did not significantly influence the teaching effectiveness of the science teachers. On the other hand, variables, like qualifications, experience, and size of the family were found to be significantly influencing the level of their teaching effectiveness.

10. Attitude towards teaching profession was found to be the most significant variable in influencing the teaching effectiveness of science teachers. The more the favourable attitude they possess the more would be their level of teaching effectiveness.

11. The science teachers who were highly cooperative in their teaching were proved to be significantly more effective than the moderate and less cooperative science teachers.

12. Science teachers who were highly kind enough were proved significantly more effective in their teaching than the other two groups of science teachers.

13. Highly patient science teachers were proved to be significantly more effective in their teaching than the moderate and less patient science teachers.

14. Wide interest of the science teachers could significantly influence the level of their teaching effectiveness.
15. Aptitude dimension, Fairness could bring a significant and positive impact on the effectiveness of science teachers.

16. The higher the moral character of science teachers the higher was their teaching effectiveness and vice versa.

17. Discipline could bring a positive and significant influence in the level of teaching effectiveness of science teachers.

18. Highly optimistic science teachers were proved to be significantly more effective in their teaching than the moderate and low optimistic science teachers.

19. Scholarly taste of a science teacher had a positive significant bearing on teaching effectiveness.

20. Highly enthusiastic science teachers were proved significantly more effective in their teaching than the moderate and low enthusiastic science teachers.

Thus, all the ten dimensions in the teaching aptitude test namely cooperative attitude, kindliness, patience, wide interests, fairness, moral character, discipline, optimism, scholarly taste, and enthusiasm were significantly influencing the teaching effectiveness of science teachers.

21. The low group of science teachers on Factor-A (A-) appeared to be more effective in their teaching
effectiveness than the middle and high groups, but the differences were not statistically significant.

22. Factor-B, intelligence could bring significant influence on the teaching effectiveness of science teachers. The middle group of science teachers with average intelligence were significantly more effective in their teaching than the other two groups of science teachers.

23. Factor-C could significantly influence the level of teaching effectiveness. C+ was associated with more teaching effectiveness.

24. The trend indicated that the lower the scores on Factor-E, the higher was the teaching effectiveness of the science teachers, although there were no significant differences.

25. Factor-F could bring significant difference among the three groups in their teaching effectiveness. Low group of science teachers were proved to be significantly more effective in their teaching than the other two groups.

26. Factor-G of 16 PF could not bring any significant variation in the corresponding teaching effectiveness scores.

27. Factor-H could not bring any significant influence on teaching effectiveness of science teachers.
28. Low group on Factor-I appeared to be more effective in their teaching than the middle and high group science teachers altogether the differences were not significant.

29. Factor-L could not significantly influence the level of teaching effectiveness of science teachers.

30. Factor-M was not a significant personality factor in influencing the teaching effectiveness of science teachers.

31. The low and high group of science teachers on Factor-N appeared to be more effective in their teaching than the middle group science teachers, but the variations were not significant.

32. Factor-O could significantly associated with the teaching effectiveness of science teachers. High scorers on Factor-O proved to be more effective than others.

33. The high scores on Factor-Q₁ appeared to be more effective in their teaching than the middle and low groups of science teachers. However, the differences were not statistically significant.

34. The low group of science teachers on Factor-Q₂ were significantly more effective in their teaching than the middle and high groups.
35. Factor-$Q_3$ of 16 PF could not significantly influence the level of teaching effectiveness of science teachers.

36. Factor-$Q_4$ of 16 PF also did not exhibit any significant bearing on the teaching effectiveness of science teachers.

Thus, out of 16 personality factors only five factors i.e., B, C, F, O and $Q_2$ could influence the level of teaching effectiveness of science teachers significantly.

37. The profile similarity coefficient $r_p$ was significant and hence the personality profiles of more and less effective groups of science teachers were not different.

38. The characteristics of more effective science teachers were as follows: They were better qualified, moderately experienced, and represented from small families, they were possessing more favourable attitude towards teaching profession and high aptitude in teaching. On the contrary the less effective science teachers were less qualified, more experienced and or less experienced, represented from large families. They were also possessing less favourable attitude towards teaching profession and little aptitude in teaching.

Among the personality characteristics emotionally stable (C+), humble (E-), conscientious (G+), self-reliant (I-), brooding (O+), and group dependent ($Q_2^-$) were
associated with more teaching effectiveness, while the opposite poles of these characteristics were associated with less teaching effectiveness.

39. It could be possible to predict teaching effectiveness of science teachers, with the help of personal, demographic and psychological variables. As much as 56.7 per cent of the variance in teaching effectiveness was accounted for by a bunch of 11 independent variables.