CHAPTER - VII
FINDINGS AND DISCUSSION

7.0 INTRODUCTION

This chapter presents the findings and discussion of the present study. The objective of this study was to know the present teaching-learning process of Computer Education (both theory and practical) at standard VIII level and to develop a suitable training programme for computer education teachers. Also, the developed training programme was implemented and its effectiveness had been observed in terms of changes in teaching-learning process, reaction of the teachers on training programme and achievement of students taught by trained teachers after the training programme. In order to achieve these objectives, the study was conducted in three phases. The findings of the study are presented below.

7.1 MAJOR FINDINGS BASED ON CONTENT ANALYSIS OF THE COMPUTER EDUCATION TEXTBOOK

1. From the content analysis of chapter one i e. *Introduction to Computers*, it was found that the chapter is of information type dealing with computer terminologies. It was found to be theoretical which needs lecture and discussion method, advance Organizer Model, teaching aids related to computer hardware and adequate teacher-student interaction The chapter needs mainly project work for evaluation with 60 percent to 70 percent mastery

2. From the analysis of chapter two i e. *Windows concepts and Components*, it was found that the chapter is of mixed type i.e. theory cum practical dealing with concepts and components of Windows XP operating system. It was found to be theory cum practical which needs demonstration and discussion method, inductive approach, Mastery Learning Approach Model, teaching aids like computer and LCD projector and adequate teacher-student interaction The chapter needs mainly project work along with continuous and comprehensive evaluation with 80 percent to 100 percent mastery.

3. From the analysis of chapter three i e. *Files and Folders*, it was found that the chapter is of mixed type i.e. theory cum practical dealing with creating and managing files and folders. It was found that the major emphasis is on practical which needs demonstration and discussion method, inductive approach for theory and participatory for practical, Mastery Learning approach Model, computer and LCD projector as teaching aids and adequate teacher-student and student-student interaction. The chapter needs mainly project work along with continuous and comprehensive evaluation with 80 percent to 100 percent mastery.

4. From the analysis of chapter four i.e. *Using Additional Windows Facilities*, it was found that the chapter is of mixed type i.e theory cum practical dealing with using of Accessories It was found that the major emphasis is on practical which needs demonstration method, inductive approach for theory and participatory approach for practical, Mastery Learning Approach Model, computer and LCD projector as teaching aids and adequate interaction teacher-student and student-student interaction. The chapter needs mainly project work for evaluation with 80 percent to 100 percent mastery.

5. From the analysis of chapter five i e. *Introduction to Word Processing Using MS Word*, it was found that the chapter is of mixed type i e. theory cum practical dealing with features of Word Processor. It was found that the major emphasis is on practical which needs demonstration method, inductive approach for theory and participatory approach for practical, Mastery Learning approach Model, computer and LCD Projector as teaching aids and adequate teacher-student and student-student interaction. The chapter mainly needs project work for evaluation with 80 percent to 100 percent mastery.

6. From the analysis of chapter six i e. *Introduction to Internet (Part-I)*, it was found that type chapter is of mixed type i.e. theory cum practical dealing with internet and its use. It was found that the major emphasis is on theory which needs lecture cum discussion method, participatory approach, advance Organizer Model, chart of computer network, working of World Wide Web and picture of modem and server as teaching aids and adequate teacher-student and student-student

interaction. The chapter also needs project work for evaluation and 60 percent to 80 percent mastery

7. From the analysis of chapter seven i.e. *Algorithm Development (Part-I)*, it was found that the chapter is of theoretical dealing with Algorithm development, flow chart and variable, The major emphasis is on theory to develop logical thinking ability of the students which needs problem solving and discussion method, inductive approach, Mastery Learning Approach Model, flow chart and its symbol as teaching aids, and adequate teacher-student and student-student interaction. The chapter also needs project work for evaluation with 80 percent to 100 percent mastery.

7.2 MAJOR FINDINGS BASED ON THE PRE-TRAINING AND POST-TRAINING OBSERVATION OF THEORY CLASSES

Here, the major findings of the pre-training and post-training observation of theory classes are presented in tabular form containing two columns. The first column 'A' is based on the major findings arrived at through the analysis and interpretation of pre-training observation of Computer Education theory classes. The second column 'B' is based on the major findings arrived at through the analysis and interpretation of post-training observation of Computer Education theory classes. The detailed findings are follows.

Table 7.1 Major Findings based on the Pre-training and Post-training Theory Observation Analysis and Interpretation of Data

(A) Findings based on the Pre-training Observation of Theory Classes	**(B) Findings based on the Post-training Observation of Theory Classes**
1. In terms of use of lesson plan/outline, it was found that in all the classes teachers didn't use lesson plan/outline for teaching.	**1.** In terms of use of lesson plan/outline, it was found that in 68.75 percent of classes teachers used lesson plan/outline for teaching.

2. In terms of introducing the lesson, it was found that in 34.48 percent; lesson was introduced using *'previous knowledge testing'*, 12.50 percent by *'demonstration'* and 53.12 percent *'arbitrarily'*.	**2.** In terms of introducing the lesson, it was found that 81.25 percent of classes lesson was introduced using *'previous knowledge testing'*, in 18.75 percent by *'demonstration'*, where as, not a single lesson was introduced *'arbitrarily'*.
3. In terms of use and purpose of using textbook during teaching, it was found that in 50 percent of classes textbook was used and in rest of the 50 percent classes teachers didn't used. In 12.50 percent classes, the purpose of using text book was *'to dictate'*, in 50 percent *'to explain'* and in rest of 37.50 percent, it was *'something else'* like *'to show window screen', 'to refer the topic to be taught', 'to confirm what to teach', 'to draw picture and to refer content and examples'*.	**3.** In terms of use and purpose of using textbook during teaching, it was found that in 75 percent of classes textbook was used and in another 25 percent of classes teachers did not used. In 8.33 percent of classes, the purpose of using textbook was *'to dictate'*, in 50 percent *'to explain'* and in rest of 41.67 percent, it was *'something else'* like – *'to show the picture of hardware', to explain the content', and 'to underline important points'*.
4. In terms of approaches of teaching, it was found that in 65.33 percent of classes teachers followed *'inductive approach'* and in 34.37 percent *'problem solving'*, where as, *'deductive approach'* was not used at all. From informal discussion with teachers, it was found that teachers had no knowledge about approaches of teaching.	**4.** In terms of approaches of teaching, it was found that in 68.75 percent of classes, teachers followed *'inductive approach'*, in 18.75 percent *'deductive approach'* and in 12.50 percent *'problem solving'*.
5. In terms of students' participation during teaching, it was found that in majority of classes i.e. 40.63 percent, it	**5.** In terms of students' participation during teaching, it was found that in majority of classes i.e. 87.50 it was

was *'moderate'* and in one-forth of classes there was *'no participation'* at all, where as, in 6.25 percent, students' participation was *'maximum'*.	*'maximum'* and in 12.50 percent *'moderate'* where as, not a single class it was found *'very less'* and *'not at all'*.
6. In terms of students' response during teaching, it was found that in majority of classes i.e. 43.75 percent, it was *'moderate'* and in one-eighth of classes, there was *'no response'* at all, where as, in 6.25 percent students' response was *'maximum'*. During observation, it was found that there was no scope for students to give response because teacher himself/herself gave response/answer immediately after questioning.	**6.** In terms of students' response during teaching, it was found that in majority of classes i.e. 87.50 percent it was *'maximum'* and in 12.50 percent *'moderate'* where as, not in a single class it was found 'very less' and *'not at all'*. It was also found that teachers gave chance to students' for answering questions.
7. In terms of use of blackboard, quality of blackboard work and purpose of using blackboard during teaching, it was found that in majority of classes i.e. 68.75 percent blackboard was not used at all, where as, in 31.25 percent blackboard was used. With respect to quality of blackboard work in 60 percent of classes it was *'satisfactory'*; where as, in 40 percent of classes it was *'not satisfactory'*. Further, it was found that in 20 percent of classes blackboard was used for *'detailed work'*, whereas, equal percent of each i.e. 40 percent of classes, blackboard was used for *'explanation of difficult content'* and for *'drawing different components of computer'*.	**7.** In terms of use of blackboard, quality of blackboard work and purpose of blackboard work, it was found that in 93.75 percent of classes' blackboard was used. With respect to quality of blackboard work, in majority of classes i.e. 73.33 percent it was *'excellent'*, where as, in 26.67 percent it was *'satisfactory'*. Further, it was found that in 60 percent of classes' blackboard was used for *'detailed work'*, in 26.67 percent for *'explanation of difficult content'*, and in 13.33 percent for *'drawing components of computer'*.

8. In terms of use and types of teaching aids, it was found that in majority of classes i.e. 59.37 percent teaching aids was used and in 40.63 percent it was not used. With respect to type of teaching aids, it was found that in majority of classes i.e. 73.68 percent *'computer'* was used as a teaching aid and in 15.79 percent real objects like Mother Board, Hard Disk, CPU, Computer and Monitor. Further, it was found computer was used in theory cum demonstration class.	**8.** In terms of use and types of teaching aids, it was found that in majority of classes i.e. 62.50 percent teaching aids was used and in 37.50 percent it was not used. With respect to type of teaching aids, it was found that in equal percent of classes i.e. 40 percent each *'computer'* and *'model'* (real object) like Mother Board, Hard Disk, CPU, Computer and Monitor, and in 20 percent *'diagram'* was used.
9. In terms of use of skills, it was found that in majority of classes i e. 62.52 percent explanation was *'poor'*, in 34.38 percent and in 87.50 percent illustration with example and reinforcement skill was *'not used'* at all respectively and in 56.25 percent questioning was *'poor'* and in 90.63 percent achieving closure was *'not used'* at all. Further, it was found that teacher explained the content by reading the textbook, didn't write key points and statements on blackboard, teachers didn't gave chance to students for answering and asked two to three question at time.	**9.** In terms of use of skills, it was found that in majority of classes i.e. 93.75 percent, 68.75 percent, 74 percent and in 81.25 percent explanation, illustration, reinforcement and questioning was *'excellent'*, where as an equal percent of classes i.e 31.25 percent achieving closure was found *'excellent'* and *'average'*.
10. In terms of level of questions asked in classes, it was found that *'knowledge level'* and *'understanding levels'* of questions finds equal weightage i.e. 32.57	**10.** In terms of levels of questions asked in classes, it was found that in 47.45 percent, 34.18 percent and 13.27 percent of classes *'knowledge level'*,

percent each, while *'application levels'* of questions were not given more importance.	*'understanding level'* and *'application level'* questions were asked respectively, where as, *'inquiry level'* questions were given less importance.
11. In terms of students' questions, it was found that in majority of classes i.e. 65.63 percent students *'didn't asked questions at all'*, in 28.12 percent *'rarely'* asked and in 6,25 percent *'sometimes' asked.*	**11.** In terms of students' questions, it was found that in equal percentage of classes i.e. 25 percent it was *'very often'* and *'sometimes'* and in 18.75 percent students 'rarely' asked questions.
12. In terms of assignment and type of assignment given by teachers, it was found that in majority of classes i.e. 78.13 percent of classes *'teachers didn't gave assignment'*, and 21.87 percent *'teachers gave assignment'*, where as, 57.14 percent f from the given assignment was of *'oral assignment'*, and 28.57 was of *'written problem solving'*.	**12.** In terms of assignment and type of assignment given by teacher in theory classes, it was found that in 25 percent of classes *'teachers gave assignment'* and 75 percent *'teachers didn't gave assignment'*, where as, 75 percent from the given assignment was of *'oral assignment'* and 25 percent was of *'written problem solving'*.
13. In terms of home work given by teachers, it was found that in large majority of classes i.e. 84.37 percent *'teachers didn't give home work'* to students based on content taught.	**13.** In terms of homework given by teachers, it was found that in large majority of classes, i.e. 87.50 percent *'teachers didn't give homework'* to students based on content taught.
14. In terms of quality of classroom management, it was found *'average'* in 53.12 percent of classes and in 28.13 percent *'poor'*. Further, it was found that teachers didn't pay attention to students' other activities like talking among	**14.** In terms of classroom management, it was found *'good'*, in 93.75 percent of classes and in 6.25 percent *'average'*, where as, not in a single class it was found *'poor'*. It was also found during observation that teachers immediately

themselves, teasing to one another, pushing through pen and also there was no interaction between teacher and students.	intervened while students were talking; there was good interaction between teacher and students through the process of questioning and discussion and teachers ensured proper sitting arrangement during demonstration.
15. In terms of summarization and process of summarization of lesson at the end of period, it was found that in large majority of classes i.e. 84.37 percent teacher didn't summarize the lesson. On the other hand 15.63 percent of classes' teachers summarized through *'questioning'*, *'demonstration on the computer'* and *'consolidation of major points'*.	**15.** In terms of summarization and process of summarization of lesson at the end of the period, it was found that in large majority of classes i e. 87.50 percent teachers summarized through *'questioning'* and in 14.28 percent each was summarized by *'demonstrating on computer'* and *'consolidation of major points'*.
16. In terms of method of teaching used by teachers, it was found that in 43.75 percent, 53.13 percent of classes teachers used *'lecture method'* and *'demonstration method'*, where as, in 3.12 percent *'question answer method'* was used.	**16.** In terms of method of teaching used by teachers, it was found that in 37.50 percent of classes teachers used *'lecture method'*, where as in equal percent of classes i e. 31.25 percent *'demonstration'* and *'lecture cum demonstration'* method was used.
17. In terms of appropriateness, interesting and involvement of students with respect to methods, it was found that in large majority i.e. 71.42 percent, 78.57 percent and 64.29 percent lecture method was *'appropriate'*, *'less interesting'* and *'less involvement of students'* respectively. Further it was found that in majority of	**17.** In terms of appropriateness, interesting and involvement of students with respect to methods, it was found that in majority of classes i.e. 88.33 percent, 66.67 percent and 88.33 percent lecture method was *'most appropriate'*, *'more interesting'*, and *'more involvement of students'* respectively.

classes i.e. 64.71 percent, 47.06 percent and in 76.47 percent demonstration method was found *'appropriate', 'less interesting'* and *'less students' involvement'* respectively.	➢ In majority of classes i.e. 80 percent each demonstration method was found *'most appropriate'* and *'most interesting'*, where as, in all the classes there was *'more involvement'* of students. In all the classes lecture cum demonstration method was *'most appropriate'*, where as, in equal percentage of classes i.e. 80 percent each lecture cum demonstration method was *'more interesting'* and *'more involvement'*.

7.3 MAJOR FINDINGS BASED ON PRE-TRAINING AND POST-TRAINING CLASSROOM OBSERVATION OF PRACTICAL CLASSES

Here, the major findings of the pre-training and post-training observation of practical classes are presented in tabular form containing two columns. The first column 'A' is based on the major findings arrived at through the analysis and interpretation of pre-training observation of Computer Education practical classes. The second column 'B' is based on the major findings arrived at through the analysis and interpretation of post-training observation of Computer Education practical classes. The detailed findings are as follows.

Table 7.2 Major Findings based on the Pre-training and Post-training Practical Observation Analysis and Interpretation of Data

(A) Major Findings based on Pre-training Classroom Observation of Practical Classes	(B) Major Findings based on Post-training Classroom Observation of Practical Classes
1. In terms of sitting arrangement and instruction of the teacher, it was found that teacher didn't give importance to sitting arrangement which leads to rushing of students to occupy computer, and in almost all the classes no clear/specific instruction regarding practical was given to students.	**1.** In terms of seating arrangement and instruction of the teachers, it was found that teachers allotted specific/particular computer to a pair of students for always and gave instruction for seating in a half circle manner during demonstration on T.V. attached to CPU. It was also found that clear instruction leads to the consistency among students work.
2. In terms of nature of work assigned to work out in practical classes, it was found that teachers assigned work orally like 'practice what was taught in last theory period', 'draw a picture with the help of paint', 'type a text and practice the function like cut, copy paste', 'practice format Menu', 'practice Super-script and Sub-script, Bold, Italic, underline' etc.	**2.** In terms of nature of work assigned to workout in practical classes, it was found that teachers gave importance to step wise written instruction to assign practical work. The nature of practical work was found to be creative, skill based, problem solving ad application type.
3. In terms of use of textbook, it was found that teachers used the textbook to show the different components of computer and to explain particular paragraph during demonstration. On the other hand students used the textbook to type the text and to practice the exercise.	**3.** In terms of use of textbook, it was found that there was decrease in use of textbook and increase in the use of workbook and note copy. It was found that teachers used workbook to dictate project and students used note copy to follow instruction.

4. In terms of teachers activities, it was found that teachers activities were routine i.e. demonstrating and didn't enquire or questions whether students had understood or not. Further, it was found that teachers didn't provide opportunities to students for interaction and clarification of their doubts. Again, it was found that teachers used negative remark to maintain discipline.	**4.** In terms of teachers' activities, it was found systematic i.e. first dictating the work to be done; demonstrating on T.V. and randomly asking few students to demonstrate. It was also found that teachers provided opportunities to students to help each other and clarified their doubts by individual guidance.
5. In terms of students' activities in the practical classes, it was found that students' practical works were based on the instruction and attention of the teacher. Teachers' improper attention leads to inconsistency in students' practical work. Further, it was found that cooperation and discussion among students helped them to solve their problems or tasks	**5.** In terms students activities in the practical class, it was found that their practical work was based on the project work dictated by teacher at the beginning of class and attention of the teacher. It was also found that teacher proper attention leads to consistency in their work. Further, it was found that cooperation and discussion among students made their task easy and teachers extra effort during recess time helped weak students to complete their task.
6. In terms of students' query/questions and teachers response, it was found that students query were specific problem/task based and the dis-functioning of computer. It was also found that bigger size class with single teacher and engagement of teacher other than practical activities became the obstacle for providing individual attention.	**6.** In terms students' query/questions and teachers response, it was found that students query were specific problem or task based, where as, teachers responded students query individually by going nearby to him/her and instructed students step by step elated to problem.

7. In terms of practical class management by teachers, it was found that teachers were lacking in classroom management and used repressive measure to maintain discipline.	**7.** In terms of practical class management by teachers, it was found managed properly.
8. In terms of the assignment for next class, it was found that teachers didn't give assignment to students.	**8.** In terms of assignment for next class, it was found that in six classes' teachers' gave assignment and asked the students to complete the work in next class to those students who had not completed the task.
9. In terms of supervision by teachers, it was found that the teachers were not able to supervise students work because of reasons like, one teacher allotted for supervision; completion of period and s/he was busy in other than practical work.	**9.** In terms of supervision by teachers, it was found that teachers checked students' practical work by attending individual pair of students and also checked their work at the end of period. It was also found that teachers guided students during recess time.

7.4 MAJOR FINDINGS OF THE EFFECTIVENESS OF THE TRAINING PROGRAMME IN TERMS OF TEACHERS REACTION

The findings of the effectiveness of the training programme have been observed in terms of the reaction of the teachers on the nine days training programme that they had undergone. The findings of the reaction of teachers are presented in three sub-sections. They are as follows.

7.4.1. Major Findings based on the Content of the Training Programme

In terms of the content of the training programme, it was found to be good according to the reaction of ht participant teachers. A large majority of the respondent teachers varying from 33.33 percent to 100 percent were *'strongly agree'* related to the

contents like, importance of the training, aims, objectives and writing instructional objectives, principles and maxims of teachings, skills of teaching, instructional media, classroom environment, classroom management, methods and approaches of teaching, cooperative learning, models of teaching- Advance Organizer Model and mastery learning Model, evaluation, and cognitive lesson planning

Again the percentage of respondent teachers varying from 16.67 percent to 66.67 percent were also *'agree'* for the above mentioned content of the training programme. Further, 16 66 percent of respondent i.e. only one teacher responded *'can't say'* related to concept of models of teaching applicable for teaching computer and Advance organizer Model. This shows that almost all the respondent were either *'strongly agree'* or *'agree'* to the content of the training programme, where as, very less number of respondent (only one respondent) was *'neutral'* to two component of the content of training programme. It shows highly positive reaction of the participant towards the content of the training programme. Hence, it may be considered that the content of the training programme found effective in terms of participant reaction.

7.4.2. Major Findings based on the Implementation of the Content of Training Programme

In terms of the implementation of the content of training programme, it was found to be good according to the reaction of the participant teachers, A large number of the participant teachers varying from 33 33 percent to 100 percent were *'strongly agree'* related to the aspects like, training provided by experts, language of the experts, dealing of content by exert, activities after each session, interestingness of activities, comprehensiveness of training adequacy of training material, time management of the training programme, time duration of each session, adequacy and appropriateness of used media, arrangement during training programme and participation teachers during training.

Again the percentage of respondent varying from 16.66 percent to 50 percent were also *'agree'* for the implementation of the content of the training programme. Further, 16.66 percent of respondent i.e. only one teacher respondent *'can't say'* related to dealing of content by experts, activities after each session and adequacy of the training material. Further more, 16.66 percent of respondent i e. only one teacher was *'strongly disagree'*

related to time management of the training programme and time duration of each session. This shows that majority of the respondent teachers were either *'strongly'* or *'agree'* to the implementation of the content of training programme, where as, very less number of respondent (only one respondent) was neutral to dealing of content by experts, activities after each session and adequacy of the training material and also *'strongly disagree'* with respect to time management of the training programme and time duration of each session. It shows highly positive reaction of the participant teachers towards implementation of the content of training programme except one respondent in two aspects. Hence, it may be considered that the implementation of the content of training programme found appropriate and effective in terms of participant teachers reaction.

7.4.3. Major Findings based on the Feasibility and Usefulness of the Training Programme

In terms of the feasibility and usefulness of the training programme for computer teachers, it was found to be good according to the reaction of the participant teachers. Majority of the participant teachers varying from 50 percent to 66 67 percent were *'strongly agree'* related to the feasibility of the input of the training programme to use in the classroom and usefulness of training programme for computer teachers.

Again the percentage of respondent varying from 33.33 percent to 50 percent were also *'agree'* to the feasibility of the input of the training programme and usefulness of training programme for computer teachers. It shows that majority of the respondent were either *'strongly agree'* or *'agree'* to the feasibility and usefulness of the training programme. It shows the positive reaction of the participant towards the feasibility of the input and usefulness of the training programme for computer teachers Hence, it may be considered that the content of the training programme will be feasible and useful for computer teachers in future.

7.5. MAJOR FINDINGS BASED ON THE COMPUTER EDUCATION ACHIEVEMENT OF STUDENTS

The major findings of the effectiveness of the training programme in terms of students achievement in computer Education overall, theory and practical are as follows.

1. In terms of overall, theory and practical adjusted mean achievement score of students taught by the teachers' undergone training was found significantly higher than the same of the students' taught by the teachers without the training programme.
2. In terms of overall and practical adjusted mean achievement scores of English medium students taught by the teachers' undergone training programme was found significantly higher than the same of the students taught by the teachers without the training programme.
3. In terms of the theory adjusted mean achievement score of English medium students taught by the teachers' undergone training programme was not found different from the same of the students taught by the teachers without the training programme.
4. In terms of overall, theory and practical adjusted mean achievement score of Gujarati medium students taught by the teachers undergone the training programme was found significantly higher than the same of the students taught by the teachers without the training programme.

7.6. DISCUSSION ON THE FINDINGS OF THE STUDY

The above mentioned findings of the study are discussed under three sections. They are as follows.

7.6.1 Discussion on the Development of the Training Programme

The intent of this study was to develop and implement a training programme for Computer Education teachers. Any training programme to be effective must be based on the need. Tengku (1994) suggested that 'the concern and need of the teachers involved should be the basis for the development programme in computers literacy'. So, for the present study need was assessed by analyzing the content of Computer Education textbook to determine the needed teaching pedagogy and observing the present practices of Computer Education teaching learning process.

Curriculum is the keystone of educational theory and practice. The textbook reflect the curriculum and it commands a central role in the transaction of curriculum and the transactional activities get centered on the textbook. The textbook comes 5to serve as a comprehensive source of information (Goodlad, 1984, cited in Halim, 2004). The detailed analysis of the textbook determines the needed pedagogy for that particular subject like methods, approaches, teaching aids, interaction, models of teaching evaluation etc. From the analysis of the Computer Education textbook of standard VIII, it was found that the nature of content was of theoretical (informative) and theory cum practical which needs different pedagogy. However, maximum emphasis has been given on practical.

From the detailed analysis of the content of computer Education textbook, the teaching learning framework was prepared which include type of chapter, teaching methods, approaches, models of teaching required, teaching aids required, interaction pattern, evaluation and required mastery level This analysis of Computer Education textbook became one of the inputs for the training programme. (For detail framework refer table 4.1 to 4.7).

The classroom teachers are the best media for implementing curriculum in the actual classroom situation. Better implementation of curricula material depends on the quality of teachers and quality of teachers may depend on their content knowledge and proper training. The pre-training observation of Computer Education theory and practical classes of schools, it was found that the teachers were well equipped with the content knowledge of computer. But with respect to the pedagogical aspect, it was found that the teacher didn't use lesson plan during teaching in all the classes and 50.12 percent of the classes the lessons were introduced arbitrarily. The informal discussion with teachers revealed that the teachers had no knowledge about principles, maxims and approaches of teaching. With respect to students' participation and response, it was found moderate in 40.63 percent and very less in 43.75 percent of classes respectively. This shows that there was no proper interaction between teacher and students during transaction of curriculum. This also indicates that the classroom environment was not conducive for interaction. The observation with respect to different skills of teaching it was found that teachers were lacking in the knowledge and skills of teaching. In majority of classes, it was found that teachers didn't give importance to home work and assignment. It was also observed that

teachers were lacking in the classroom management skill. In terms of methods of teaching, it was found that teachers used lecture and demonstration method but the use of these methods were found less interesting and there was less involvement of students. (For detail frequency and percentage refer Chapter V). Lacking of teachers in pedagogy of teaching may be due to no exposure of teachers in teaching methodology and lack of triaging.

In Computer Education practical i.e. hands on experience is the base of the subject. Without practical, theoretical knowledge has no value. The observation of practical classes in the computer laboratory can through light on the kind of transaction or interaction taking place between teacher and students, and students and students. The findings of the pre-taining observation of practical classes indicate that importance was not given to sitting arrangement and clear instruction regarding practice. It was also observed that lack of teachers' attention and improper supervision leads to inconsistency in among students work. The improper supervision may be due to the over crowded class, single teacher in the laboratory and sometimes teacher was engaged other than practical work. These became the obstacle in providing individual attention to students work. Teachers adopted the technique like shouting, and punishing the students to maintain discipline. During observation, it was also observed that teachers discouraged the helping one student to another. All the above discussed findings lead to conclude that teachers were lacking in pedagogical knowledge to transact the Computer Education curriculum in an effective manner. These observations in theory and practical classes became the input for the training programme. (For detail inputs refer Appendix I). The findings of the pre-training assessment of training needs also directly or indirectly reflects in the findings and suggestions of studies conducted by McCrow (1993), Jabber (1997), Al-Furaih (1989), Candrakar (2002), Matai (1998), Vaghela (2002) and Gohil (2005).

7.6.2 Discussion on the Implementation of the Training Programme

Considering the teaching-learning process followed in Computer Education theory and practical classes and the identified pedagogy needed for each chapter of the Standard VIII textbook the inputs for the training programme was developed and implemented for nine days. For better implementation the experts' helps were also taken. During the training programme, it was observed that teachers showed interest in learning the pedagogical

inputs like aims and objectives, writing instructional objectives, skills of teaching, principles and maxims of teaching, methods and approaches, classroom environment and classroom management, cooperative learning, models of teaching, evaluation and lesson planning. Teachers were finding easy to understand and did the activity given after each session by interacting in the group, whereas, they found difficult in understanding the concept of Advance Organizer model and the activity related to it. The difficulty in understanding may be due to not having enough background and exposure to teaching pedagogy and psychology of learning.

7.6.3. Discussion on the Effectiveness of the Training Programme

The findings of the reaction of the participant teachers towards the content, implementation and usefulness of the training programme, it was found effective. But the reaction of the participant teachers indicates that they found difficulty in understanding the concept of Advance Organizer Model of teaching. The effectiveness of the training programme in terms of participants reaction was may be due to the proper need assessment for transacting Computer Education at standard VIII, dealing of the content properly by the experts and researcher and the usefulness of the training components meeting the demand of the Computer Education Subject.

Teacher is the best agent and also responsible for transacting curriculum effectively in classroom situations. For effective transaction of the curriculum, both the content of computer education and pedagogy of teaching are important. The findings of the post-training observation of theory classes' indicate the change in the teaching behaviour of the teachers in terms of use of lesson plan/outline of lesson plan, introducing the lesson, use of textbook, purpose of using textbook, approaches of teaching, students participation, students response, frequency and quality of blackboard work, use and type of teaching aids, use of various skills, levels of questions asked, quality of classroom management, summarization and process of summarization and methods used in the in comparison to pre-training observation of theory classes. (For detail frequency and percentage refer Chapter V).The above mentioned changes in the teaching behaviour of teacher may be due to the impact of the training programme. But with respect to assignment and home work given by the teachers, it was found that there is very little change. Teachers also did not emphasize on it. It may be due the over burden of teachers

in teaching work and other than teaching work or may be due to the fact that it is not considered as a compulsory subject. It was also observed that the teachers were entirely busy from period one to eight which leads to not emphasizing on assignment and homework.

The findings of the post-training observation of practical classes in comparison to pre-tainting observation, it was found that there is positive change with respect to classroom (computer laboratory) sitting arrangement during demonstration and practice, and instruction before practice, nature of work assigned with clear instruction, teacher's response, teachers' supervision, classroom management and assignment for next class. All these changes may be due to the impact of training programme. During observation it was also found that teachers created cooperative learning environment and guided the students in recess time. It was also observed that the period allotted for practical was not sufficient for students to practice as two students have to work in one computer. The study conducted by ISRO (1990), Patadia (1993), Gupta (1999), Vaghela (2000) and Ansari (2002) also found that insufficient time allotted for Computer Education. Enough time for practice should be provided to the student to master the skills and to develop creativity as computer education is a skill based subject and also develops creativity in students.

The findings of the study with respect to the achievement of students on Computer Education overall, theory and practical shows that the adjusted mean score of experimental group was significantly more than the control group. This difference may be due to the impact of the training programme. But an important thing was observed i.e. the pre-test mean achievement score of control group in comparison to experimental group was very high – 51.7 percent and 10.5 percent respectively. The post-test adjusted mean achievement score of experimental group was found higher than the control group. This difference shows the effectiveness of training programme. Further analysis of the above phenomena, it was revealed that it was due to the earlier exposure of students to Computer Education at standard VII level and some aspect of Standard VIII was also taught to them. Again it was revealed from the informal discussion with the teachers that the Gujarati medium students of experimental group had no exposure at all to Computer Education in previous class. These Gujarati medium students were from other school where there was no computer education. The medium wise findings shows that the overall

and practical adjusted mean achievement score of English medium was significantly more than the control group, whereas, the theory achievement was not significantly more. The overall, theory and practical adjusted mean achievement score of Gujarati medium students of experimental group was significantly more than the control group. This achievement may be due to the impact of training programme. The studies conducted by Eleen (1999), William (1999), Thompson (2000), Vusumeri (2001) and Unger (2002) also showed the effectiveness of the teacher training programme.