CHAPTER - V

ANALYSIS AND INTERPRETATION OF PRE-TRAINING AND POST-TRAINING OBSERVATION DATA

5.0 INTRODUCTION

The present chapter is aimed at analysis and interpretation of classroom observation of theory and practical classes before and after the training programme to realize objective one and six i.e. objective 1· *'to study the teaching-learning process at secondary school level'* and objective 6: *'to study the effectiveness of the developed teacher training programme in terms of teachers' teaching behaviour'*. The methods of data collection using various tools are presented in Chapter III. Data for the present chapter were collected using participatory observation. The data are analyzed and interpreted in two segments viz. (i) analysis and interpretation of data based on pre-training and post-training classroom observation of theory classes, and (ii) analysis and interpretation of data based on pre-training and post -training classroom observation of practical classes collected at different phases of the study.

5.1 ANALYSIS AND INTERPRETATION OF DATA BASED ON PRE-TRAINING AND POST-TRAINING CLASSROOM OBSERVATION OF THEORY CLASSES

Computer Education is comparatively a new, exciting and dynamic area of study that offers the pupils a chance to use their creative power and faculties of mind. In this context, it is essential that teachers engage pupils in tasks that exemplify the creativeness of students and usefulness of computers. The knowledge and beliefs of computer teachers in strongly influence their classroom activities and ultimately that also influence pupils' learning. In teaching, methods, skills and techniques are important aspects of the teaching-learning process that contributes to a great extent to the transaction of curriculum. Therefore, it was decided by the investigator to participate in some theory and practical classes and to observe various activities of both teachers and students in the classes. The purpose of this observation was to know the existing teaching learning process in-terms of teaching methods, skills, techniques, resources used, the interaction between teachers and students and the process of evaluation used by teachers which in turn helped to understand the present teaching learning process. This was one of the important ingredients which helped researcher to prepare a training programme for teachers to transact the curriculum effectively in their classes.

Prior to the observation of classes, the investigator had designed the observation schedule, finalized the same with the help of the experts. The pilot test was also done. The investigator observed 32 theory classes and 25 practical classes before the training programme in eight schools of Baroda including four Gujarati medium and four English medium schools. The investigator also observed 16 theory classes and 14 practical classes after the training programme in two schools one English medium and one Gujarati medium which was taken as experimental school. The classes were observed by using the prepared observation schedule. Each class was of 70 minutes duration.

The analysis and interpretation of data have been made based on the observation. The data are converted into frequency and percentage. While observing the theory classes, the investigator also recorded the qualitative aspect of the data. Sometimes the investigator had informal discussion with the teachers to have in-depth understanding of their teaching learning process. The observations of practical classes were recorded qualitatively and quantitatively. For the analysis of practical observation, content analysis was used. The analysis and interpretation of data regarding the teachers and students activities in the theory classes are presented as follow.

Table 5.1: Frequency wise and Percentage wise Distribution of Classes before and after the Training Programme with reference to the use of Lesson Plan during Teaching Learning Process

Use of Lesson Plan	Before Training		After Training	
	Frequency	Percentage	Frequency	Percentage
Lesson plan used	00	00	11	68.75
Lesson plan not used	32	100.00	05	31.25
Total	32	100.00	16	100.00

From table 5.1 it was observed about the use of lesson plan before the training programme that not a single teacher used lesson plan or an out line of a plan while teaching theory. So, systematic and scientific preparation before teaching was doubtful. Informal discussion with the teachers revealed that they had no knowledge about lesson planning.

From the same table, it was also observed about the use of lesson plan after the training programme that in 68.75 percent of classes, teachers used lesson plan, where as, in 31.25 percent of classes teachers didn't used the lesson plan. From the above table, it could be interpreted that the change in the use of lesson plan by the teacher in a positive direction may be due to the impact of training programme.

Table 5.2: Frequency wise and Percentage wise Distribution of Classes before and after Training Programme with reference to the ways of Introducing the Lesson

Ways of Introducing the Lesson	Before Training		After Training	
	Frequency	Percentage	Frequency	Percentage
Through previous knowledge	11	34.38	13	81.25
Using demonstration	04	12.50	03	18.75
Arbitrarily	17	53.12	00	00.00
Total	32	100.00	16	100.00

From table 5.2 it was observed before the training programme that in 34.38 percent of classes, lessons were introduced by *'previous knowledge'*, in 12.50 percent of classes, lessons were introduced by *'demonstration'*, where as, in 53.12 percent of the classes, lessons were introduced *'arbitrarily'* From the above table it could be interpreted that majority of the lessons were introduced arbitrarily and even not a single lesson was introduced by any relevant activity. During the lessons those were introduced arbitrarily, it was observed that the teachers introduced the lesson in the following ways.

- Teacher said, *"In previous class we learned about calculator. So, today we will learn 'WordPad', and 'Note Pad'.*
- Teacher enquired from the students about the topic completed in previous class and started teaching.
- Teacher said, *"Open your book page number 87"* and started teaching.
- Teacher drawn the picture of *'Desk top'* on blackboard and in another class draw the picture of *'toolbox'* and started explaining it to students.
- Teacher asked the students, *"what did I taught you in previous class?"* and asked few students to read what was dictated to them in previous class and started teaching.
- Teacher confirmed from the students about the topic taught in the previous classes and started dictating.
- Sometime teachers started teaching immediately after entering into the class.

From the same table after the training programme, it was observed about the ways of introducing the lesson that in 81.25 percent of the classes, lessons were introduced by *'testing previous knowledge'*, in 18.75 percent of the classes lessons were introduced by *'demonstration'* and not a single lesson was introduced *'arbitrarily'*. From the table 5.2, it could be interpreted that the change in the way of introducing the lesson in a positive direction may be due to the impact of the training programme.

Table 5.3: Frequency wise and Percentage wise Distribution of Classes before and after the Training Programme with reference to the use of Textbook by Teachers during Teaching

Use of Textbook by Teachers	Before Training		After Training	
	Frequency	Percentage	Frequency	Percentage
Used	16	50.00	12	75.00
Not used	16	50.00	04	25.00
Total	32	100.00	16	100.0

From table 5.3, it was observed before the training programme that in 50 percent of the classes teachers *'used textbook'* while teaching theory and in another 50 percent of the classes teachers *'didn't used textbook'* while teaching theory.

From the same table, it was also observed about the use of textbook after the training programme that in 75 percent of the classes teachers *'used textbook'* while teaching theory and in another 25 percent of the classes teachers *'didn't used textbook'* while teaching theory. From the above table, it could be interpreted that the increase in the use of the textbook by the teachers may be due to the impact of training programme.

Table 5.4: Frequency wise and Percentage wise Distribution of Classes with reference to the Purpose of Using Textbook during Teaching

Purpose of Using Textbook	Before Training		After Training	
	Frequency	Percentage	Frequency	Percentage
To dictate	02	12.50	01	08.33
To explain	08	50.00	06	50.00
For something else	06	37.50	05	41.67
Total	16	100.00	12	100 0

From table 5.4, it was observed before the training programme that out of the teachers used textbooks during teaching, in 12.50 percent of classes teachers used the textbook *'to dictate something'* from the book, 50 percent teachers used it *'to explain'* and rest 37.50 percent teachers used the textbook for *'something else'* like as follow.

- To show some aspects of *Windows Screen.*
- To tell the students about the topic teacher was supposed to teach.
- To refer the topic to be taught.
- To confirm what the teacher had to teach.
- To draw the picture of *'Toolbox of Paint'.*
- To refer the content and examples given in the textbook.

From the above mentioned analysis it could be interpreted that a large number of teachers did not do prior preparation for teaching and for the same they use the textbook.

From the same table, it was also observed about the purpose of using textbook after training programme that in 8.33 percent of classes teachers used the textbook *'to dictate'* from the book, 50 percent *'to explain'* and rest 41.67 percent teachers used the textbook for *'something else'* like as follow

- To show the picture of *hard disk.*
- To explain the content.
- To underline the important points.

From the above table, it could be interpreted that the change in the purpose of using textbook may be due to the impact of training programme. It may also lead to the conclusion that teachers had prior preparation for teaching.

Table 5.5: Frequency wise and Percentage wise Distribution of Classes before and after Training Programme with reference to the Approaches adopted by the Teachers during Teaching

Teaching Approach Used	Before Training		After Training	
	Frequency	Percentage	Frequency	Percentage
Inductive	21	65 25	11	68.75
Deductive	00	00.00	03	18.75
Problem solving	11	34.37	02	12.50
Total	32	100.00	16	100.0

From table 5.5, it was observed before the traming programme that in 65.63 percent of classes' teachers followed *'inductive'* approach of teaching, where as, *'problem solving'* approach was used in 34.37 percent of the classes. The table also depicted that *'deductive'* approach of teaching was not used at all. The informal discussion with teachers about the approaches of teaching, it was revealed that a large number of teachers had no knowledge about the approaches of teaching. Thus, the above mentioned percentage about the use of different teaching approaches may not be purposive and may be due to chance factor.

From same table, it was observed after the training programme that in 68.75 percent of classes teachers followed *'inductive'* approach of teaching, in 18.75 percent classes they followed *'deductive'* approach and in 12.50 percent classes they followed *'problem solving'* approach. From this table, it could be interpreted that there is an increase in the use of deductive and inductive approaches by the teachers during teaching may be due to the impact of the training programme.

Table 5.6: Frequency wise and Percentage wise Distribution of Classes before and after Training Programme with reference to Students' Participation during Teaching

Degree of Students' Participation	Before Training		After Training	
	Frequency	Percentage	Frequency	Percentage
Maximum	02	06.65	14	87.50
Moderate	13	40.63	02	12 50
Very less	09	28.12	00	00.00
Not at all	08	25 00	00	00.00
Total	32	100.00	16	100.00

From table 5.6, it was observed before the training programme that in case of 6.25 percent, 40.63 percent, 28.12 percent and 25 percent of theory classes, students' participation was found to be *'maximum'*, *'moderate'*, *'very less'* and *'not at all'* respectively. From the same table, it could be interpreted that in majority of classes i.e., 40.63 percent, the degree of students' participation was *'moderate'* and in one-forth of the classes there was no students' participation at all. Apart from this, some observations were recorded regarding students' participation in teaching those were as follow.

- Students' only listen to teachers' teaching and occasionally participate in discussion.
- Teacher asked only few students to demonstrate the use of different *'Sub Menu'* like *'Font'*, *'colour'*, *'Find* and *Replace'*, and *'Insert Bullets'*.
- In theory cum demonstration class students only observes the demonstration and neither asked questions nor participated in discussion/demonstration.

From the same table, it was also observed about the students' participation after the training programme that in 87.50 percent and 12.50 percent of classes students' participation was found to be *'maximum'* and *'moderate'* respectively, where as, not in a single class it was found *'very less'* and *'not at all'*. Apart from this few observations were recorded regarding students' participation in teaching were as follow.

- Students' participated in the process of question-answer.
- Students' participated in the discussion related to the use and applications of computer.
- Students asked questions whenever they couldn't understand.
- When teacher asked students to demonstrate, students demonstrated.

From the above table, it could be concluded that there was an increase in the students' participation and this increase in students' participation during teaching-learning process may be due to the impact of the training programme.

Table 5.7: Frequency wise and Percentage wise Distribution of Classes before and after Training Programme with reference to Students' Response during Teaching

Degree of Students' Response	Before Training		After Training	
	Frequency	Percentage	Frequency	Percentage
Maximum	02	06.25	14	87.50
Moderate	12	37.50	02	12.50
Very less	14	43.75	00	00.00
Not at all	04	12.50	00	00.00
Total	32	100.00	16	100.00

From table 5.7, it was observed before the training programme that in 6.25 percent of classes students' response was *'Maximum'*, in 37.50 percent of classes it was *'moderate'*, in 43.75 percent of classes it was found *'very less', where as,* in 12.50 percent of classes there was *'no response'* from students side. From the above table, it could be interpreted that in majority i.e., 43.75 percent of the classes, the degree of students' response was *'very less'* and in one-eighth of classes there was *'no students' response at all'*. Apart from these, the nature of students' response was also recorded during teaching. Those were as follow.

- Students' responses came in *chorus.*
- Students' responses were in the form of *'Yes'* or *'No'* and it was also in chorus.
- In all most all the classes there was no scope for students to give response to teachers' questions as the teachers himself/herself gave the response immediately after questioning
- Individual response came from the students very rarely.

From the same table, it was also observed about the students' response after the training programme that in 87.50 percent and 12.50 percent of classes students' responses were found to be *'maximum'* and *'moderate'* respectively, where as, not in a single class it was found *'very less'* and *'not at all'*. Apart from this few observations were recorded regarding students' participation in teaching. Those were as follow.

- Students individually responded to teachers' questions.
- Teachers gave chances to students for answering individually.
- Teachers tried to avoid chorus response and instructed students to raise their hands for answering questions.

From the same table, it could be interpreted that increase in students' responses and the process of response in positive direction may be due to the impact of the training programme.

Table 5.8: Frequency wise and Percentage wise Distribution of Classes before and after Training Programme with reference to the Frequency of Blackboard Use by the teachers

Frequency of Blackboard Use	Before Training		After Training	
	Frequency	Percentage	Frequency	Percentage
Very often	04	12.50	08	50.00
Often	04	12.50	07	43.75
Rarely	02	06.25	00	00.00
Not at all	22	68.75	01	06.25
Total	32	100.00	16	100.00

From table 5.8, it was observed before the training programme that in 12.50 percent of classes the frequency of blackboard use was *'very often'*, in 12.50 percent of the classes it was *'often'*, in 06.25 percent of classes it was *'rarely'*, where as, in 68.75 percent of the classes the blackboard use was *'not at all'*. From the same table, it could be interpreted that in majority i.e., 68.75 percent of classes, blackboard was not used by the teachers; where as, only in 31.25 percent of classes blackboard was used by the teachers for teaching with different degree.

From same table, it was also observed about the frequency of blackboard use after the training programme that in 50 percent of the classes the frequency of blackboard use was *'very often'*, in 43.75 percent of the classes it was *'often'*, and in 06.25 percent of the classes it was *'not at all'*. From the same table, it could be found that there is an increase in the frequency of using blackboard and this increase in the use of blackboard may be due to the impact of the training programme.

Table 5.9: Frequency wise and Percentage wise Distribution of Classes before and after Training Programme with reference to the Quality of Blackboard Work done by teachers

Quality of Blackboard work	Before Training		After Training	
	Frequency	Percentage	Frequency	Percentage
Excellent	00	00.00	11	73.33
Satisfactory	06	60.00	04	26.67
Not satisfactory	04	40.00	00	00.00
Total	10	100.00	15	100.00

From table 5.9, it was observed before the training programme that the quality of blackboard work done by teachers was *'satisfactory'* in 60 percent of classes and in 40 percent of classes it was found 'not *satisfactory'* because the content was written inappropriately and in a disorganized manner. The excellent quality of blackboard work was not found in a single class. Further, it could be interpreted that out of the classes where blackboard were used, in majority i.e., 60 percent of classes, the quality of blackboard work was satisfactory, where as, in rest of the classes it was found not satisfactory.

From the same table, it was also observed after the training programme that the quality of blackboard work done by teachers in 75.33 percent of classes was *'excellent'* and in 26.67 percent classes, it was found *'satisfactory'*, because the content was written appropriately and in an organized manner having logical sequence of teaching points, where as, not in a single class blackboard work was found *'not satisfactory'*. With the same table, it could be interpreted that there was a drastic change in the quality of blackboard work and this improvement in the use of blackboard may be due to the impact of training programme.

Table 5.10: Frequency wise and Percentage wise Distribution of Classes before and after Training Programme with Reference to the Purpose of Using Blackboard

Purpose of Using Blackboard	Before Training		After Training	
	Frequency	Percentage	Frequency	Percentage
Detailed work	02	20.00	09	60.00
Explanation of difficult content	04	40.00	04	26.67
To draw components of computer	04	40.00	02	13.33
Total	10	100.00	15	100.00

From table 5.10, it was observed before the training programme that out of the classes where blackboard was used, in 20 percent of classes blackboard was used for the purpose of *'detailed work'* and an equal percentage of each i.e., in 40 percent of classes blackboard was used for the purpose of *'explanation of difficult content'* and for *'drawing different components of computer'* respectively. From this table, it could be interpreted that in less number of classes i.e., in 20 percent cases only the blackboard was used for *'detailed work'*.

From same table, it was also observed after the training programme that out of the classes where blackboard was used, in 60 percent of classes blackboard was used for the purpose of *'detailed work'*, in 26.67 percent of classes blackboard was used for the purpose of *'explanation of difficult content'* and in 13.33 percent classes it was used for *'drawing charts and different components of computer* From this table it could be concluded that after the training programme there was a drastic change in the use of blackboard work in a positive direction and this change in the purpose of using blackboard may be due to the impact of training programme.

Table 5.11: Frequency wise and Percentage wise Distribution of Classes before and after the Training Programme with Reference to the Use of Teaching Aids

Use of Teaching Aids	Before Training		After Training	
	Frequency	Percentage	Frequency	Percentage
Used	19	59.37	10	62.50
Not used	13	40.63	06	37.50
Total	32	100.00	16	100.00

From table 5.11, ıt was observed before the training programme that in 59.37 of percent classes *'teachıng aids were used'*, where as, in the rest 40.63 percent of classes *'teaching aids were not used'*. Further, it could be interpreted that in majority i.e., 59.37 percent of classes, teaching aids were used by the teachers. During the time of observation it was observed that the teaching aids used by the teachers were real objects like, *Mother Board, Hard Disk,* Computer, *CPU* and *Monitor.* Computer was found used only in demonstration classes.

From the same table, it was also observed after the traınıng programme that in 62.50 percent of classes 'teaching aids were used', where as, in the rest 37.50 percent of classes *'teaching aids were not used'.* Durıng the tıme of observatıon, it was observed that the teaching aids used by the teachers were real objects lıke, *Mother Board, Hard Disk, CPU, Keyboard, Monitor, Floppy, and Compact Dısk* both writeable and rewritable. From the same table, it could be concluded that increase in the use of teaching aids by teachers during teaching may be due to the impact of the traınıng programme.

Table 5.12: Frequency wise and Percentage wise Distribution of Classes before and after the Training Programme with Reference to Appropriateness, Effectiveness and Students' action about Teaching Aids

Appropriateness, Effectiveness and Students' Reaction about Teaching Aids	Before Training		After Training	
	Frequency	Percentage	Frequency	Percentage
1) Appropriateness	19	100.00	10	100.00
2) Effectiveness	19	100.00	10	100.00
3) Students' reaction				
(a) Student observed	19	100.00	10	100.00
keenly	00	00.00	05	50.00
(b) Students question	02	10.52	05	5000
(c) Students' answer to				
the questions posed				
by teacher				

From the table 5.12, it was observed before the training programme that out of the classes where teaching aids were used, all the teaching aids were found to be *'appropriate'*, *'effective'*, where as, with respect to students' reaction towards teaching aids, it was found that in all the classes *'students observed keenly'* and in 10.52 percent of classes *'students were able to answer the questions posed by teacher'*. Further it was observed that not in a single class students asked question related to teaching aids.

From the same table, it was also observed after the training programme that out of the classes where teaching aids were used, all the teaching aids were found to be *'appropriate'*, *'effective'*, where as, with respect to students' reaction towards the teaching aids, in all the classes *'students observed keenly'* and in 50 percent of the classes *'students asked questions frequently'* and in 60 percent of classes *'students were able to answer questions posed by the teacher'*. From the same table, it could be concluded that there was a change in the reaction of students towards the teaching aids and the change in students action may be due to the initiatives taken by the teachers either in presenting the teaching aid properly or doing some sorts of act related to teaching aids which may be due to the impact of the training programme.

Table 5.13: Frequency wise and Percentage wise Distribution of Classes before and after the Training Programme with Reference to the type of Teaching Aids Used

Type of Teaching Aids	Before Training		After Training	
	Frequency	Percentage	Frequency	Percentage
Computer	14	73.68	04	40.00
LCD Projector	02	10.53	00	00.00
OHP/Film/Projector/Slides	00	00.00	00	00 00
Posture/Charts/diagrams	00	00.00	02	20.00
Model (real objects)	03	15.79	04	40.00
Total	19	100.00	10	100.00

From table 5.13, it was observed before the training programme that out of the classes where teaching aid were used, in 73.68 percent of classes *'computers'* were used, in 10.53 percent of classes *'LCD projector'* were used and in 15.79 percent of classes *'models'* (real objects) were used during teaching. But the teaching aids like, *'OHP', 'Film projector', 'Slide', 'Poster', and 'Charts'* were not used in any classes. Further, it could be interpreted that computer was the most popular teaching aid among teachers which was found used only in demonstration classes.

From the same table, it was also observed after the training programme that out of the classes where teaching aids were used an equal percentage of each i.e. 40 percent of classes *'computer'* and *'model* (real objects)' were used, in 20 percent of classes *'diagram'* was used. The above table also revealed that teaching aids like, OHP, LCD Projector, and Slides were not used. During informal discussion with teachers, it was revealed that the teaching aids like, *'OHP', 'LCD projector' and 'slide projector'* were not provided to them or not permitted to use. From the same table, it could be concluded that there is an increase in the use of different types of teaching aids which may be due to the impact of the training programme.

Table 5.14: Frequency wise and Percentage wise Distribution of Classes with Reference to the use of Skills

Before-Training Observation								
Skills Used	Excellent		Average		Poor		Not at all	
	F	%	F	%	F	%	F	%
1. Explanation	06	18.75	21	62.52	05	15.63	00	00
2. Illustration with Example	01	03.12	10	31.25	10	31.25	11	34.38
3. Reinforcement	00	00	01	03.12	03	09.37	28	87.50
4. Questioning	01	03.12	08	25.00	18	56.25	05	15.63
5. Achieving Closure	00	00	02	6.25	01	03.12	29	90.63
After-Training Observation								
Skills Used	**Excellent**		**Average**		**Poor**		**Not at all**	
	F	**%**	**F**	**%**	**F**	**%**	**F**	**%**
1. Explanation	15	93.75	01	06.25	00	00	00	00
2. Illustration with Example	11	68.75	05	31.25	00	00	00	00
3. Reinforcement	12	75.00	04	25.00	00	00	00	00
4. Questioning	13	81.25	03	18.75	00	00	00	00
5. Achieving Closure	05	31.25	05	31.25	00	00	06	37.50

From the table 5.14, it was observed before the training programme that in 18.75 percent of classes the use of explanation skill by teachers was *'excellent'*, in 65.62 percent of classes the use of the same skill was *'average'* and in 15.63 percent cases it was found to be *'poor'*. Some aspects of the explanation skills used by teachers were observed as follow.

- Teachers explained the content by reading the text from the book and simultaneously showed the picture of windows screen given in the book.
- In few classes teachers' explanation was continuous where students listen passively.
- In between the explanations teachers asked the students to see the pictures given in the textbook.

- During explanation teachers didn't write the key points and statements on the blackboard. Teachers, who had used blackboard, didn't write key points in organized manner

From the table 5.14, it was also observed before the training programme that in 3.12 percent of classes the use of illustration with example skill was found *'excellent'*, in 31.25 percent cases each, it was found to be *'average'* and *'poor'* and in 34.38 percent of classes, skill of illustration with example was not used. From the above table, it could be interpreted that in majority of classes i.e., 68.76 percent the skill of illustration with example was either not used or used with poor quality and it was found excellent in very less number of classes.

From the table 5.14, it was also observed before the training programme that in 3.13 percent of classes, the use of reinforcement skill was *'average'*, in 9.37 percent it was found to be *'poor'* and in 87.50 percent of classes skill of reinforcement was not used. From the above table it could be interpreted that the skill of reinforcement was not excellent at all and in majority of classes i.e., 87 50 percent it was not used at all.

From the table 5.14, it was also observed before the training programme that in 3.12 percent of classes the questioning skill was *'excellent'*, in 25 percent classes it was found to be *'average'*, in 56.25 percent classes it was found to be *'poor'* and in 15.63 percent of classes the questioning skill was *'not used'*. From the same table, it could be interpreted that in majority of classes i.e., 56.25 skill of questioning was found to be *'poor'*. Some aspects of the questioning skills used by teachers were observed as follow.

- After asking questioning teachers didn't gave chance to students for answering and teachers himself/herself answered immediately. For example:

Teacher's question: *What is 'C', 'D' and 'E' drive?*

Teacher's answer: *'C' and 'D' drive are the drive where software programmes, files and folders are stored and 'E' is the drive used to run CD*

- Teacher asked more than one questions at a time like, *Have you seen Property? Have any one moved icon from one place to another?* Answer to these questions came in chorus i.e., *'Yes'* and *'No'*.
- While demonstrating on the computer, teachers rarely asked questions.

From the table 5.14, it was also observed before the training programme that in 3.12 percent of classes each the skill of achieving closure was found to be *'average'* and *'poor'*. In 90.63 percent of classes the skill of achieving closure was not used. From the same table, it could be interpreted that in majority of classes i.e., 90.63 percent the skill of achieving closure was *'not used'*.

Table 5.14 leads to the conclusion that teachers were lacking in the use of different skills of teaching. All most all the teachers were found not well versed with the skills like, questioning, reinforcement and achieving closure.

From the same table 5.14, it was also observed after the training programme that out of the classes where explanation skill was used, in 93.75 percent of classes the use of explanation skill by teachers was *'excellent'*, and in 6.25 percent of classes, it was *'average'*. Some aspects of the skills used by teachers were observed as follow.

- During explaining teachers ensured the understanding of the students by asking questions.
- During explanation teachers wrote the key points and statements on the blackboard.
- While explaining with the help of teaching aids, teachers showed the teaching aids in such a way that all the students could observe.
- Whenever needed teachers asked the students to refer book to see pictures.

From the same table it could be concluded that there was a positive change in the use of skill of explanation by the teachers which may be due to the impact of the training programme.

From the same table, it was also observed after the training programme that out of the classes where illustration with example skill was used, in 68.75 percent of the classes the use of illustration with example skill was found to be *'excellent'*, and in 31.25 percent classes it was found to be *'average'*. From the table, it could be interpreted that there was a positive changes in the use of skill of illustration with example by teachers which may be due to the impact of the training programme.

From the same table 5.14, it was also observed after the training programme that out of the classes where reinforcement skill was used, in 75 percent of classes the use of reinforcement skill was found to be *'excellent'*, and in 25 percent it was found to be *'average'*. So it could be interpreted that there was a change in the use of skill of reinforcement in positive direction by the teachers which may be due to the impact of the training programme.

From the table 5.14, it was also observed after the training programme that out of the classes where questioning skill was used, in 81.25 percent of classes it was found to be *'excellent'*, and in 18.87 percent classes it was found to be *'average'*. Some aspects of the questioning skill used by teachers were observed as follow.

- Teachers' questions were precise.
- After questioning, teachers allowed the student to answer.
- After questioning there was proper pause.
- Teachers tried to avoid chorus answer.
- Teachers' asked one question at a time.
- During demonstration, teachers asked questions to students.

From this, it could be interpreted that there was a positive change in the use of questioning skill by teachers' and it may be due to the impact of the training programme.

From the same table, it was also observed after the training programme that out of the classes where achieving closure was used, in an equal percentage of classes i.e. 31.25 percent, it was found to be *'excellent'* and *'average'*, where as, in 37.50 percent of classes it was *'not used at all'*. From this, it could be interpreted that there was a positive change in the use of achieving closure skill by the teachers as compared to before training observation which may be due to the impact of the training programme.

Table 5.14 leads to the conclusion that after the training programme there is a positive change in the use of different skills by the teachers as compared to the use of skills before training programme.

Table 5.15: Frequency wise and Percentage wise Distribution of Classes before and after Training Programme with Reference to the Levels of Questions Asked by the Teachers

Levels of questions asked	Before Training			After Training		
	Frequency	Average no. of questions asked	Percentage	Frequency	Average no. of questions asked	Percentage
Knowledge level	43	1.34	32.57	93	5.18	47.45
Inquiry level	34	1.06	25.76	10	0.62	5.10
Understanding level	43	1.34	32.57	67	4.18	34.18
Application level	12	0.38	09.10	26	1.62	13.27
Total	132	4.12	100.00	196	12.23	100.00

From the table 5.15, it was observed before the training programme that 32 57 percent, 25.76 percent, 32.57 percent and 09.10 percent questions asked were of *'Knowledge level', 'Inquiry level', 'Understanding level' and 'Application level'* respectively.

Table 5.15 also revealed that among all the levels of questions, percent and frequency of *'Knowledge level'* and *'Understanding level'* were equal i.e., 32.57 percent each, where as, 25 76 percent of questions were of *'Inquiry level'* and 09.10 percent questions were of *'Application level'*. Further, it could be interpreted that application level of questions were very low i.e., 9.10 percent only.

Further more, it could be interpreted that knowledge and understanding level of questions finds equal weightage during teaching while application level of questions were not given more importance. The average number of questions per class was found to be 4.12 percent. Along with this, it was also observed that teachers didn't give chance to students for answer even if students raised their hands and teacher himself/herself answered that immediately.

From the same table, it was observed after the training programme that 47.45 percent, 5.10 percent, 32.57 percent and 13 27 percent questions asked were of *'knowledge level'*, *'inquiry level'*, *'understanding level'* and *'application level'* respectively.

The same table also revealed after the training programme that there is an increase in the percentage of asking knowledge level, understanding level and application level questions, where as, there is decline in asking inquiry level of questions. The average number of questions per class was found to be 12.23 percent. From the same table, it could be interpreted that the change in the average number of questions and percentage of questions after the training programme may be due to the impact of the training programme.

Table 5.16: Frequency wise and Percentage wise Distribution of Classes before and after Training Programme with Reference to Students' Questions

Students' Questions	Before Training		After Training	
	Frequency	Percentage	Frequency	Percentage
Very often	00	00.00	04	25.00
Sometimes	02	06.25	04	25.00
Rarely	09	28.12	03	18.75
Not at all	21	65.63	05	31.25
Total	32	100.00	16	100.00

From table 5.16, it was observed before the training programme that that in 6.25 percent, 28.12 percent and 65.63 percent of classes students asked questions *'sometimes'*, *'rarely'* and *'not at all'* respectively. From the same table, it could be interpreted that in majority i.e., 65.63 percent of classes, students didn't asked questions. Further, it could be interpreted that in 34.37 percent classes students asked questions either *'sometimes' or 'rarely'*. From this it could be concluded that the classes were teacher dominated and students ask very few questions.

From the same table, it was observed after the training programme that in an equal percentage of each i.e. 25 percent, classes students' questions were found to be *'very often'* and *'sometimes'*, in 18.75 percent of classes, it was *'rarely'*, where as, in 31.25 percent of classes students didn't asked question at all. From the same table it could be interpreted that there was an increase change in the students' questions in the class after the training programme which may be due to the impact of training programme.

Table 5.17: Frequency wise and Percentage wise Distribution of Classes before and after Training Programme with Reference to the Assignments given by the Teachers

Assignments given by teachers	Before Training		After Training	
	Frequency	Percentage	Frequency	Percentage
Given	07	21.87	04	25.00
Not given	25	78.13	12	75.00
Total	32	100.00	16	100.00

From table 5.17, it was observed before the training programme that in 21.87 percent of classes *'assignment was given by the teachers at the end of the class'*, where as, in rest of the classes i.e., 78.13 percent *'assignment was not given by the teachers'*. From the same table, it could be interpreted that in majority i.e., 78.13 percent of classes' assignment was not given by the teachers at the end of the classes.

From the same table, it was observed after the training programme that in 25 percent of classes *'assignment was given by teachers at the end of class'*, where as in rest of the classes i.e. 75 percent *'assignment was not given by the teachers'*. From the same table, it could be interpreted that as compared to before training phase, there is a very little change after the training programme in terms of giving assignment by the teachers which could be concluded that the training programme may not have any impact in this regard.

Table 5.18: Frequency wise and Percentage wise Distribution of Classes before and after Training Programme with Reference to the Type of Assignments given by the Teachers

Type of Assignment Given	Before Training		After Training	
	Frequency	Percentage	Frequency	Percentage
Oral	04	57.14	03	75.00
Written problem solving	02	28.57	01	25.00
Others	01	14 29	00	00.00
Total	05	100.00	04	100.00

From table 5.18, it was observed before the training programme that out of classes in which assignment was given, 57.14 percent of the assignments were of *'oral'* type, 28.57 percent of the assignments were of *'written problem solving'* type and 14.29 percent the assignments were of *'others'* type like, demonstration on the computer etc. From the above table it could be interpreted that oral assignments were given more importance, where as, the assignments like, demonstration on computer was given less importance.

From the same table, it was also observed after the training programme that out of the classes in which assignment was given, 75 percent of the assignments were of 'oral' type and 25 percent were of 'written problem solving' type. From the same table, it could be interpreted that teachers gave importance to oral assignments, where as, written problem solving was given less importance. From the same table again it could be interpreted that there is no much change in the type of assignment even after the training programme and they emphasize more on oral assignments.

Table 5.19: Frequency wise and Percentage wise Distribution of Classes before and after Training Programme with Reference to Home Work given by Teacher

Home work given by the teachers	Before Training		After Training	
	Frequency	Percentage	Frequency	Percentage
Given	05	15.63	02	12 50
Not gıven	27	84.37	14	87.50
Total	32	100.00	16	100.00

From table 5.19, it was observed before the training programme that in 15.63 percent of classes teachers *'gave home work to students'*, where as, in 84.37 percent of classes teachers *'dıdn't give any home work to students'*. From the above table, it could be ınterpreted that teachers didn't gıve more importance to home work. During observatıon, it was also observed that teachers dıctated the answer himself after givıng home work to students.

From the same table, it was observed after the traınıng programme that in 12.50 percent of classes *'teachers gave home work to students'*, where as, ın 87.50 percent of classes *'teachers didn't gave any home work to students'*. From thıs, it could be interpreted that there is no change ın the teachers' behaviour even after the training programme in terms of gıving homework to the students.

Table 5.20: Frequency wise and Percentage wise Distribution of Classes before and after Training Programme with Reference to the Quality of Classroom Management by the Teachers

Quality of Classroom Management	Before Training		After Training	
	Frequency	Percentage	Frequency	Percentage
Good	06	18.75	15	93.75
Average	17	53 12	01	06.25
Poor	09	28.13	00	00.00
Total	32	100 00	16	100 00

From table 5.20 it was observed before the training programme that in 18.75 percent of classes, classroom management was found to be *'good'*, in 53.12 percent of the classes, it was found to be *'average'* and in the rest of the 28.13 percent of the classes it was found to be *'poor'*. From the same table it could be interpreted that, in majority of classes i.e. 53.12 percent classroom management by teachers was found to be average. During observation following points were observed with respect to classroom management.

- In almost all the classes (except few where LCD projector was used) students were busy in other works like, *talking among themselves, teasing to one another, pushing through pen* etc. These behaviours were observed among the back row students and teachers didn't pay attention to these behaviours.
- In few classes teachers *'knocked the duster on the table'* and loudly said *'don't talk'* to maintain discipline in the class.
- Except few classes, it was observed that there was no interaction between teacher and students. Always the classes were found to be teacher dominated.
- During demonstration on computer, back row students use to 'stand *up to see'* as it was not clearly visible to them. But the same was not happened while demonstration was done through LCD projector.

From the same table, it was observed after the training programme that in 93.75 percent of the classes, classroom management was found to be 'good' and in 6 25 percent it was found to be 'average'. During observation following points were observed with respect to classroom management.

- In two classes few students were busy in talking among themselves which was immediately intervened by teachers.
- There was good interaction between teacher and student through the process of questioning and discussion.
- During demonstration on computer, teacher first of all ensured proper sitting arrangement of students so that they can observe the demonstration clearly.

From the table 5.20 and the mentioned observation after the training programme, it could be interpreted that the change in the classroom management by teachers in positive direction may be due to the impact of training programme.

Table 5.21: Frequency wise and Percentage wise Distribution of Classes before and after Training Programme with Reference to Summarization of the Lesson at the End of the class

Summarization/Reviewed of the Lesson	Before Training		After Training	
	Frequency	Percentage	Frequency	Percentage
Summarization done	05	15.63	14	87.50
Summarization not done	27	84.37	02	12.50
Total	32	100.00	16	100.00

From table 5.21, it was observed before the training programme that in 15.63 percent of the classes, teachers *'summarized'* the lesson at the end of the classes, where as, in 84.37 percent of classes, teachers *'did not summarized'* the lesson at the end of the classes. From this table, it could be interpreted that in majority i.e. 84.37 percent of the classes teachers did not summarized the content taught at the end of the classes. During observation, it was also observed that the teachers used to stop teaching in between suddenly when the bell rang. From this it may be concluded that the teachers do not plan about the extent of content to be covered in a single period.

From the same table, it was observed after the training programme that in 87.50 percent of classes, teachers *'summarized the lesson at the end of the classes'*; where as, in 12.50 percent of classes, teachers *'didn't summarize'* the lesson at the end of the classes. From this table, it could be interpreted that the positive change in this behaviour of the teachers i.e. summarization of lesson at the end of the classes may be due to the impact of the training programme.

Table 5.22: Frequency wise and Percentage wise Distribution of Classes before and after Training Programme with Reference to the way of Summarizing Lessons

Ways of Summarizing Lessons	Before Training		After Training	
	Frequency	Percentage	Frequency	Percentage
By Questioning	03	60.00	10	71.44
By Problem solving	00	00.00	00	00.00
By Demonstration on the computer	01	20.00	02	14.28
By Consolidation of the major points	01	20.00	02	14.28
Total	05	100.00	14	100.00

From the table 5.22, it was observed before the training programme that out of the classes in which teachers summarized the lesson, in 60 percent of classes those were summarized by *'questioning'*, and 20 percent classes each were found to be summarized by *'demonstration on the computer'* and *'consolidation* of major points'. The table also revealed that not a single class was summarized through *'problem solving'*.

From the same table, it was observed after the training programme that out of the classes in which teachers summarized the lesson, in 71.44 percent of classes lessons were summarized by *'questioning'*, and an equal percentage of each i.e. 14.28 percents of classes lessons were summarized by *'demonstrating on computer'* and *'consolidation of major points'* respectively. From the same table, it could be interpreted that there is a positive change in the process of summarization of the lesson at the end of the class and this change in the teachers' behaviour may be due to the impact of the training programme.

Table 5.23: Frequency wise and Percentage wise Distribution of Classes before and after Training Programme with Reference to Method of Teaching used by Teachers

Methods Used in Teaching	Before Training		After Training	
	Frequency	Percentage	Frequency	Percentage
Lecture Method	14	43.75	06	37.50
Discussion Method	00	00	00	00.00
Demonstration Method	17	53.13	05	31.25
Question answer Method	01	3.12	00	00.00
Lecture cum demonstration Method	00	00	05	31.25
Discovery Method	00	00	00	00.00
Total	32	100.00	16	100.00

From table 5.23, it was observed before the training programme that in 43.75 percent, 53.13, percent and 3.12 percent of the classes teachers used *'lecture method', 'demonstration method' and 'question answer method'* respectively during their teaching. From the above table, it could be interpreted that teachers didn't used *'discussion method'* and *'discovery method'* of teaching at all and in majority i.e. 53 13 percent of classes' teachers used *'demonstration method'* of teaching.

From the same table, it was observed after the training programme that in 37.50 percent of classes *'lecture method'* was used, where as, an equal percentage of each i.e. 31 25 percent of classes *'demonstration'* and *'lecture cum demonstration method'* was used. From the same table it could be interpreted that the change in the use of method of teaching after the training programme was may be due the impact of the training programme.

Table 5.24: Frequency wise and Percentage wise Distribution of Classes before and after Training Programme with Reference to Appropriateness, Interesting and Involvement of Students in case of different method(s) of Teaching adopted by teachers during teaching

Before Training Programme																		
Methods Adopted by teachers	Appropriate						Interesting						Involvement					
	M.A.		App.		L.A.		M.I.		Int.		L.I.		M.In.		L.In.		N.A.	
	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P
(i) Lecture Method	2	14.29	10	71 42	2	14 29	0	00	3	21 43	11	78 57	0	00	9	64 29	5	35.71
(ii)Demonstration Method	6	35.29	11	64 71	0	00	2	11 77	7	41.18	8	47 06	3	17.65	13	76 47	1	5 88
(iii) Question answer Method	1	100 00	00	00	0	00	1	100 00	0	00	0	00	1	100.00	0	00	0	00
After Training Programme																		
Methods Adopted by teachers	Appropriate						Interesting						Involvement					
	M.A.		App.		L.A.		M.I.		Int.		L.I.		M.In.		L.In.		N.A.	
	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P
(i) Lecture Method	5	88.33	1	16 67	0	0	4	66.67	2	33 33	0	0	5	88 33	1	16.67	0	0
(ii)Demonstration Method	4	80.00	1	20 00	0	0	4	80.00	1	20 00	0	0	5	100 00	0	0	0	0
(iii) Lecture cum demonstration Method	5	100 00	0	0	0	0	4	80.00	1	20.00	0	0	4	80.00	1	20.00	0	0

Note: M.A.= Most Appropriate, App.=Appropriate, L.A.= Less Appropriate,

M.I.=Most Interesting, Int.= Interesting, L.I.= Less Interesting,

M.In.=More Involved , L.In.= Less Involved,

N.A.= Not at all, F= Frequency, P= Percent.

From table 5.24, it was observed before the training programme that out of 32 classes *'lecture method'* was used in 14 classes by the teachers. Out of these 14 classes, 14 29 percent, 71.42 percent and 14.29 percent of classes, lecture method was found to be *'most appropriate'*, *'appropriate'* and *'less appropriate'* respectively. In 21.43 percent and 78.57 percent of classes, lecture method was found to be *'interesting'* and *'less interesting'* respectively. With respect to involvement of the students, in 64.29 percent classes students involvement was *'less'* and in 35.71 percent classes there was *'no involvement'* of students at all. Table 5.24, it was revealed that not a single class with lecture method of teaching was found with *'most interesting'* and *'more involvement'*. Further, it could be interpreted that a large majority i.e. 71.42 percent of classes was found to be *'appropriate'*, 78.57 percent was found to be *'less interesting'* and 64.29 percent of classes were found to be *'less involved' by the students..*

From the same table 5.24, it was also observed before the training programme that out of 32 classes' *'demonstration method'* was used in 17 classes by the teachers. Out of these 17 classes, in 35.29 percent and 64.71 percent of classes demonstration method was found to be *'most appropriate'* and *'appropriate'* respectively. In 11.71 percent, 41.18 percent and 47.06 percent of classes' demonstration method was found to be *'most interesting'*, *'interesting'* and *'less interesting'* respectively. With respect to involvement of students, in 17.65 percent classes students involvement was found to be *'more'*, in 76.47 percent it was found to be *'less'* and in 5.88 percent classes students involvement was *'not found at all'*. From the table 5.24, it could be interpreted that in majority of classes i.e. 47.06 percent demonstration method was found to be *'less interesting'* and 'less' *students' involvement'* in 76.47 percent classes.

From the same table no. 5.24, item no. (iii), it was observed that question answer method was found to be 'most *appropriate'*, *'most interesting'* and involvement of students was found to be quite *'more'*.

From the same table, it was also observed after the training programme that out of 16 classes, *'lecture method'* was used in six classes by teachers. Out of these six classes, 88.33 percent and 16.67 percent of classes lecture method was found to be *'most appropriate'* and *'appropriate'* respectively. In 66.67 percent and 33.33 percent of classes, lecture method was found to be *'more interesting'* and *'interesting'* respectively. With respect to the involvement of students, in 88.33 percent and 16.67 percent of classes, it was found to be *'more involvement'* and *'less involvement'* respectively. The same table also revealed that not a single class with lecture method of teaching was found t be *'less appropriate', less interesting'* and *'no involvement at all'*. From the same table, it could be interpreted that there is a positive change in the process of lecture method in terms of appropriateness of content, interest and involvement of students, after the training programme which may be due to the impact of the training programme.

From the same table, it was also observed after the training programme that out of 16 classes *'demonstration method'* was used in five classes by teachers. Out of these five classes, in 80 percent and 20 percent of classes' demonstration method was found to be *'most appropriate', 'appropriate'* respectively in terms of appropriateness of content; *'most interesting'* and *'interesting'* respectively in terms of the interest of the students, where as, with respect to the involvement of students, it was found to be *'more involved'* in all the five classes. From the same table, it could be interpreted that the changes in the appropriateness, interesting and involvement of students after the training programme with respect to demonstration method of teaching was found to be positive and it may be due to the impact of the training programme.

From the same table, it was also observed after the training programme that out of the 16 classes, *'lecture cum demonstration method'* was used in five classes by teachers. In all the five classes lecture cum demonstration method was found to be *'most appropriate'*, where as, with respect to interesting and involvement of students an equal percentage of classes i.e. 80 percent and 20 percent, lecture cum demonstration method was found to be *'most interesting' 'interesting', 'more involvement'* and *'less involvement'* respectively. From the same table, it could be interpreted that there is a positive change in the ways of using lecture cum demonstration method and it may be due to the impact of the training programme.

5.2 ANALYSIS AND INTERPRETATION OF DATA BASED ON PRE-TRAINING AND POST-TRAINING CLASSROOM OBSERVATION OF PRACTICAL CLASSES

For the purpose of knowing the after training impact on the Practical classes, the analysis and interpretation of data have been made based on the before training observation of 25 practical classes of Standard VIII of eight different schools (four English Medium and four Gujarati Medium) and after training observation of 14 practical classes of Standard VIII of two experimental schools (One English Medium and one Gujarati Medium).The investigator observed the before training classes and after training classes were observed by a trained observer. For better and close observation and to see each and every activity of practical classes, the investigator and trained observer moved from one place to another inside the class whenever needed. The analysis and interpretation of data regarding practical classes on various points like, instruction of the teacher, classroom arrangement, nature of work assigned, use of textbook, teacher's activities, student's activities, students' query/questions, teacher's response to students queries, supervision by the teacher, classroom management and assignment given by the teacher are presented in the following section.

5.2.1 Classroom Arrangement and Instruction of the Teacher Before and After Training Programme

In almost all the schools before the training programme, the classes were divided into two groups i.e. boys and girls. While one group went for theory class another group went for practical class. But in one school twenty to twenty-five students both boys and girls went for practical class. Due to this the turn for practical of the first group came exactly after three weeks. It was so because the strength of the class was more than sixty. In another school fifty percent (half of the class) of the students including boys and girls (as per roll number) went for practical. In all the schools, teachers didn't give any instruction regarding sitting arrangement of the students. Students sat as per their wish as the teacher didn't allotted specific computer for specific pair or group of students. The ratio of computer and student was found to be 1:2 and in few classes it was found to be 1:3.

In almost all the classes, the pattern of instruction in the beginning of class was similar i.e. *'practice what was taught in previous theory class'*, or *'practice the previous work'*. As there was no clear instruction from the teachers, students practiced whatever they like to practice. It was observed from the students' practical work which was not found to be uniform. In few classes (five classes) teachers gave clear instruction orally and also wrote that on the blackboard like, *'write text and change its font, letter size'*, *'create table'*, *'insert clip art'*. In demonstration classes which were held in computer laboratory, teachers gave instruction for sitting and then demonstrate.

From the above observation, it could be interpreted that the classes were divided on the basis of sex In all the classes, the pattern of entering into the classes and occupying seats/computers, the students' behaviour was found to be similar i.e. rushing to the computers and occupying the seat as per their wish. The teachers didn't give importance to students' sitting arrangement. The instruction given at the beginning of practical classes leads to inconsistency in students' practical work.

In the experimental school after the training programme, it was observed that the classes were divided into two groups as per their roll number. While one group went for theory class another group went for practical. The sitting arrangement ratio with respect to computer and students was 1:2. Teacher allotted specific computer to specific pair of students and they were asked to work on the same computer always. It helped them to continue their previous work in forthcoming periods. Teachers also instructed the students not to rush to occupy the computers whenever they were found doing so. During demonstration teachers asked the students to sit on ground in half circular manner before a television attached to a CPU and also asked few backside students to sit on chair for clear observation.

In all the classes, the pattern of instruction was found similar i.e. teacher gave the task which they called as project work to all the students by dictating what is to be done. The teachers also dictated the steps i.e. how the task is to be done step by step. The teachers gave the task like *'creating files and folders'*, *'changing wall paper'*, *'changing of date and time'*, *'creating hierarchy of folders'* etc. It was also observed that there was uniformity in students' practical work. If any student was not practicing or busy in doing other task, teacher intervened immediately and asked to continue the given work. Whenever students were unable complete a task, teacher asked them to complete in forthcoming period. At the end of the period, teacher asked them to turn off monitor and arrange the chair properly.

From the above observation after the training programme, it could be interpreted that clear instruction was given by the teachers at the beginning of the classes. Specific allotment of computer to specific pair of students helped to save the time and reduced the rushing of students to occupy computer. The clear instruction of the teacher leads to consistency in students' practical work. From this, it can be concluded that the changes in classroom arrangement and instruction of the teachers may be due to the impact of the training programme.

5.2.2 Nature of Work Assigned to Workout before and after Training Programme

The investigator had observed and recorded different kinds of work assigned to students to workout in practical classes. Only in two classes teacher had written this assignment on blackboard which is to be done by the students. The following type of work was found assigned to the students.

- *Type a text and change its Font.*
- *Insert Bullet and Number.*
- *Give Line Spacing 2.*
- *Give Boarder and Shading.*
- *Change Case and Drop Case.*
- *Draw a Table (table was drawn on blackboard)*

In rest of the classes, teachers assigned the work orally. Almost all the teachers asked the students like, *'practice what was taught in last theory period'*, *'draw a picture with the help of Paint'*, *'type a text and practice the functions like, Cut, Copy, Paste'*, *'Insert Picture'* and *'Word Art'* in a text, *'Practice the Format Menu*, *'practice Super-Script and Sub-script, Bold, Italic, Underline'* etc. In one school teacher asked to do the project which was mentioned in their workbook.

From the said observation, it could be interpreted that teachers gave importance to oral instruction to assign task in the practical classes. The nature of work assigned for practice can be categorized into (i) creative type i.e. drawing a picture with the help of Paint, inserting Picture behind text, wash out etc; (ii) Skill based i.e. editing with the help of Format and Standard toolbar and (iii) Problem solving type i.e. creating similar mark sheet table which was drawn on the blackboard and doing addition, division with the help of table menu only.

At the time of observation after the training programme different types of work assigned to students were recorded. In all the classes, it was observed that teacher dictated the practical work to be practiced/completed by the students. The following types of work were found assigned to the students.

- *Changing the Wall Paper and Screen Saver.*
- *Creation of Files and Folders*
- *Creation of Hierarchy of Folders.*
- *Creation of shortcut of Calculator.*
- *Changing Date and Time of computer.*
- *Use of Control Panel.*
- *Use of Edit Menu· Cut, Copy, and Paste.*
- *Use of Format Menu: Bold, Italic, Underline and Font size etc.*
- *Inserting Bullet, Numbering and Line Spacing.*
- *Inserting Table and*
- *Drawing Picture through Paint Programme.*

All the above mentioned practical work assigned by teachers was named as project work and all these project works was dictated from the Workbook.

From the said observation after the training programme, it could be interpreted that teachers gave importance to written instruction to assign practical work. The nature of work assigned for practice can be categorized into (i) Creative type i.e. drawing picture with the help of paint, (ii) Skill based i.e. editing with the help of edit and format menu, (iii) Problem solving type i.e. creation of new files and folders and hierarchy of folders, changing date and time of computer and (iv) application type i.e. creation of table, changing wallpaper and screen saver and use of control panel.

5.2.3 Use of Textbook before and after Training Programme

In 12 classes the computer textbook was found used and in rest of the 13 classes textbook was not used. Out of twelve classes in which text book was used, it was used only by a teacher, in eight classes it was used by students and in three classes it was found used by both teachers and students. Teachers used the textbook to show *Windows screen, Calculator, Table,* and *Drop down Window, to instruct step by step* and *to explain particular paragraph* after reading during demonstration. Students used the textbook to type the text given in the book, to practice the exercise given in the textbook and to refer some Menu bar's Sub-menus. It was observed that teachers asked the students to refer/use textbook when they instruct orally and didn't write the exercise on blackboard. From this, it could be interpreted that teachers asked students to use textbook to avoid writing instruction or task on the blackboard.

Out of the 14 classes, it was observed after the training programme that the textbook was used in five classes. Out of these five classes in which textbook was used, in two classes it was used by teacher and in another two classes it was used by both teacher and students, where as, in one class, it was used by teacher only. Teachers used the textbook to refer the topic from which the practical work was to be assigned. Students used the textbook to type the text given in the book. Along with this, it was observed that in rest of the nine classes, workbook was used by the teachers and notebook by students. The workbook was used to dictate the project work and notebook to refer the project work.

The decrease in the use of textbook and maximum use workbook and notebook by teachers and students saved the time and helped to give and follow instruction clearly. From this, it could be interpreted that the above mentioned change was may be due to the impact of the training programme.

5.2.4 Teacher's Activities in the Class before and after Training Programme

In almost all the schools, there was a separate practical teacher who didn't take theory classes but in two schools same teachers takes both theory and practical classes. In nearly 50 percent of classes teachers used to demonstrate before students went for practice, where as, in rest of the classes students went for practice after getting oral instruction from teachers. For demonstration teacher asked the students to sit on ground in front of the computer and teacher demonstrated. In many classes, it was observed that few students were busy in talking, looking here and there but teacher didn't notice and/or remain unconcerned about it. When noticed these behaviour, teachers used to give negative remarks like, *"I will keep you out from the class", "Hey! No talking while demonstration* (with an angry tone)*".* When one student left his seat to help his friend, teacher said, *"Hey! Do you know more? Take your seat* (angrily staring at the student)*".* After demonstration, teachers used to asked students for practice. In many classes it was observed that after demonstration teachers were found busy in other activities like, demonstrating to another group or checking note/ copy, getting something print out, evaluating answer sheets etc.

From the said observation, it could be interpreted that teachers' activities were found to be routine and mechanical as teacher demonstrate only and even didn't enquire or questioned whether students had understood it or not. Teachers hardly provided opportunities to the students for interaction and clarification of their doubts. Further, it could be interpreted that teachers lacked in the skill of attending students' behaviours and used negative remarks for maintaining discipline in the class.

In the experimental school, there were separate practical teachers who didn't take theory classes. In all the classes, teacher dictated the practical task step by step which was to be done by the students. After dictation teacher demonstrated the task step by step on television which was attached to CPU. During demonstration teacher asked questions and also asked few students to do the task before students to unsure whether they were observing or not. After demonstration teacher instructed the students to occupy and work on specific computer allotted to them. The teacher also encouraged the students to help each other if they fond any difficulties. During the practical work, teacher visited near to individual pair of students to check their work. In one class, it was observed that when a student opened game teacher immediately asked to close the game. In all the classes, it was observed that teacher provided guidance to students who faced difficulties. In many classes, it was observed that teachers asked few students (who are unable to complete the work in the period) to work on recess time and teacher was there to guide them.

From the above said observation after the training programme, it could be interpreted that teachers' activities were found to be systematic. Teachers provided opportunity to students to help each other and also clarified their doubts by giving on task guidance. Further, it could be interpreted that the change in teachers' activities in practical classes as compared to before training observation was may be due to the impact of the training programme.

5.2.5 Students' Activities in the Class before and after Training Programme

In almost all the classes, students practiced the topic/content as asked by the teachers orally or written on the blackboard. But after five to ten minutes of the classes, it was observed that students practiced different things other than that asked by the teachers like *'WordPad', 'Notepad', 'MS Word', 'Word Art', 'Clip Art', and 'Properties'*. This inconsistency among students' work was observed when teachers were busy in other mentioned activities. Students, generally, worked in pairs by sharing the work like, one dictated and other typed, one worked for half of the period and other worked for rest of the period. Working in pair helped them to do the task smoothly as they used to discuss the problems themselves. When the pair failed to solve their problems, they took the help of other nearby friends and when they didn't find solution then asked the teacher for help. Sometime, few students directly asked the teacher for help. When teacher was not present or busy in other activity, frequent movement of students were observed in the class.

From the above observation, it could be interpreted that students' practical works were based on the instruction and attention of the teacher. Teacher's improper attention to students leads to inconsistency in their work. Cooperation and discussion among students helps them to do their task easier.

In all the classes, it was observed after the training programme that student's note down the project work dictated by the teacher and observed the demonstration keenly. After this, students started doing their work by discussion among themselves (pair of students). One student used to instruct/dictate and another perform. When one completed s/he gave chance to his/her co-partner. Working in pair helped them to do the task smoothly as they used to discuss the problem or task. When the pair failed to solve the problem they took the help of another nearby friends and when they didn't find solution they took the help of teacher. Some times they directly asked the teacher for help. It was observed that after completion of the task, they showed it to the teacher. It was also observed that there was consistency in students' practical work.

From the above observation after the training programme, it could be interpreted that students' practical work was based on the project work dictated to them and attention of the teacher. Teacher's attention leads to consistency in students work. Cooperation and discussion among students made their task easier and teachers extra effort during recess time helped the weak students to complete their task. Further, it could be interpreted that the changes in students' activities in practical classes as compared to before training observation was may be due to the impact of the training programme.

5.2.6 Students' Query/ Questions and Teachers' Response

Before training, it was observed that students' queries/questions were similar in nature i.e. asking for help when unable to do the task. They asked questions like, *'How to save file? How to insert number and bullets? How to insert table? Why red line comes below the words? How to insert picture having text as background?* Some students asked for help with respect to the dis-functioning of components of computer hardware and software like, Keyboard, mouse and some software.

The concerned teachers of practical classes tried to respond students query individually. Many a times it was observed that teacher solved the problem directly on students' computer, where as, only in two classes teacher instructed students to follow a step by step procedure instructed by the teacher. When the classes were bigger in size and/or teachers were busy in other activities, they were unable to attend individual students which lead to students' frustration and seating idle.

From the said observation, it could be interpreted that students' queries/questions were specific problem based and related to the dis-function of computers. Teachers' solving of problems on the computers of concern student may lead to development a habit of spoon feeding and it may not help to understand a particular task/problem. Bigger size of the classes with single teacher for practical became obstacles for giving individual attention.

In practical classes after the training programme, it was observed that students' query/questions were specific problem/task based i.e. asking for help when unable to do a task. They asked the queries/questions like *'How to erase words on Notepad'? 'How to close Notepad'? 'How to create short cut of calculator'? 'Clarification regarding hierarchy of folder.'* These questions/queries were asked by few pairs of students who were unable to understand the steps dictated to them.

The concerned teacher of practical classes attended/responded student's query individually by going nearby to him/her. In almost all the classes, it was observed that teacher instructed the student steps by step related to above mentioned problem.

From the above mentioned observation after the training programme, it could be interpreted that the changes in teachers' response to students; query as compared to before observation may be due to the impact of the training programme.

5.2.7 Teachers' Supervision before and after Training Programme

In almost all the classes of the observed schools before training, generally one teacher was allotted to supervise the practical class. In few classes, two teachers supervised the class. It was totally depend on the availability of teachers. It was observed that when teacher supervised the class by moving inside the laboratory students worked properly and there was consistency among students work. The guided supervision of the teachers also helps in consistency in students work. But a single teacher was unable to attend all the students. In all the classes (except three class), it was observed that teachers didn't evaluate or check students work because (i) teacher didn't take care of students work, (ii) the period was over and (iii) some times teacher remain busy in other than practical supervision activities. It was also observed that even if teacher supervised the class, s/he didn't check individual students work and also didn't asked students to save their work. Due to this students had to do the work again in next class.

From the above mentioned observation, it could be interpreted that one teacher supervision leads to improper supervision and also no evaluation of students work. It also leads to wastage of time. The incomplete students work due to completion of periods time leads to conclude that the teachers had no planning of amount of work to be given for practice.

In almost all the classes, it was observed after the training programme that two teachers supervised the practical class, where as, in few classes one teacher supervised. It was observed that teachers supervised/checked students' work by attending individual pair of students and provided guided supervision. In all the classes, it was also observed that teachers checked individual students' work who had completed and instructed to continue or complete the work in next class to those who were unable to complete. Teachers also instructed the students to save their incomplete work so that they can continue the incomplete work. In few classes, it was also observed that teacher asked the students to complete their task during recess time and teacher also supervised their work

From the above observation, it could be interpreted that guided supervision leads to consistency in students work; extra time given by teachers during recess leads to conclude that teachers gave importance to students learning. Further, it could be interpreted that the change in supervision of practical classes as compared to before training practical class supervision may be due to the impact of the training programme.

5.2.8 Class Management by Teachers before and after Training Programme

At the time of demonstration in practical class, it was observed that some students talked among themselves and some were in their own world. The teacher ignores disruption and continued his/her demonstration. In two classes it was observed that teacher shouted at them and gave punishment (bending down) and said, *"I will keep you out from the class"*. In some classes, there was frequent movement of students and it was also ignored by the teacher. The teachers didn't give instruction for sitting arrangement (mentioned in 5.2.1) and also teacher didn't check students' practical work. From this, it could be interpreted that teachers were lacking in classroom management skill.

At the time of demonstration in practical classes after the training programme, it was observed that teacher ensured for proper sitting arrangement, gave clear instruction relating to their practical work, allotted computer and attended individual student's query. It was also observed that teacher provided opportunities to students for interaction among themselves i.e. helping each other. Whenever there was any hardware or software problems occurred, teacher tried to solve it or allotted another computer At the end of the period teacher checked students' work and asked them to turn off monitor. From this, it could be interpreted that the change in classroom management skill as compared to before training practical class management was may be due to the impact of the training programme.

5.2.9 Assignment for Next Class before and after Training Programme

In all the classes of observed schools before training, it was observed that not a single teacher gave assignment to students to work out in next class. In one class a teacher said to students that, "Write down your difficulties and he will explain it in next class. From this, it could be interpreted that teachers didn't give importance to assignment. It may be due to lack of knowledge regarding the importance of assignment.

Out of the 14 classes, it was observed after the training programme that in eight classes teachers didn't gave any assignment to workout in next class. In rest of the classes teacher gave assignment to be work out in next class and also asked the students to complete their task. From this, it could be interpreted that the change in giving assignment to students as compared to before training was may be due to the impact of training programme.

5.3 Conclusion

Transaction of curriculum mainly depends upon the classroom teacher. The effectiveness of the teachers' curriculum transaction depends upon the content mastery of the subject, knowledge of the pedagogy, and the mastery of teaching learning and classroom management skills. Knowledge of pedagogy and the mastery of teaching learning and classroom management skills are acquired through the training programme mainly through in service training programme. Teachers' teaching without training programme lacks these knowledge and skills. Most of the Computer education teachers belong to this category of teachers without pedagogical knowledge and teaching skills which affects their teaching learning process. In the present study the researcher developed a short in-service training programme for computer education teachers, implemented it and find out its effectiveness. In the present chapter the effectiveness of the training programme is measured in terms of the change in teachers' behaviour before and after the training programme through classroom observation. The observation of classroom teaching-learning process of the computer education teachers revealed the picture of process of curriculum transaction. The pre-training observation of theory and practical classes revealed that the computer teachers were very good in their content area but they were found poor in pedagogical aspects like, use of lesson plan during teaching, introducing the lesson, approaches and methods of teaching, classroom interaction and classroom management skills, skills of teaching, handling students' response, giving homework and assignment etc. With respect to practical classes, it was revealed that teachers didn't give importance to sitting arrangement during demonstration and practice, improper attention and supervision to students' activities, no proper management of practical classes etc. After the training programme the post observation was done for the teachers to know the change in teachers' classroom behaviour. From the post-training observation, it was found that there was positive change in the above mentioned aspects of computer education teachers in both theory and practical classes. It showed that the training programme was found effective in terms of change in teachers' teaching behaviour. With respect to certain areas of teachers' behaviour like, giving assignment and homework, no such change in teachers' behaviour was found after the training programme.