CHAPTER 5

DISCUSSION
CHAPTER 5

FE THROUGH FIACS AND MODIFICATION TECHNICAL TEACHER BEHAVIOUR

THE SKILL OF 'QUESTIONING'

The results in Table 4.2 have revealed that there is a significant increase in the scores obtained by the is for (i) Appropriateness of context of questions (at the 5% level), (ii) Clarity of questions (at the 5% level), (iii) Technique of putting questions (at the 5% level), (iv) Purpose of questions (at the 5% level), and (v) The 'Skill of Questioning' (at the 1% level) after feedback through FIACS and that there is no significant effect on (i) Number of questions asked, (ii) Precision of questions, (iii) Nature of questions, and (iv) Variety of questions.

These results show that the 'Method of Feedback through FIACS' as outlined in Chapter III is very helpful for the student teachers in Microteaching Sessions,

(i) to increase the number of questions which are appropriate to the context in the lesson,

(ii) to ask more clearly stated questions,

(iii) to develop the proper technique of putting questions in the class, that is to say, put a question to the whole class, provide a suitable pause for all the students to think, and then call out a student (preferably at random) to answer, and

(iv) to ask more purposeful questions.

The results also show that it is not very helpful for the student teachers in Microteaching sessions to increase,
(i) the number of questions, or
(ii) the percentage of precise questions, or
(iii) the number of divergent or high order questions, or
(iv) variety in the questions asked by them.

But since the increase in the scores for the 'skill of questioning' was found to be statistically significant at the 0.05 level, this method of feedback through FLACS is quite effective for bringing about the modification of the behaviour of the technical teachers in the skill of questioning.

The fact that 34 out of the total 36 Ss preferred feedback through FLACS for developing the skill of questioning by giving a rating score of 4 and more (out of the maximum possible rating score of 9) with the group Mean of 6.94, and that 37 out of the total 36 Ss expressed their opinions supporting the effectiveness of feedback through FLACS for improving the skill of questioning by giving a rating score of 4 and more (out of the maximum possible rating score of 9) with the group Mean of 7.11, also support the finding that it has a significant effect on the modification of Technical Teacher behaviour by improving his skill of questioning.

THE SKILL OF 'DEALING WITH ANSWERS'

The results in Table 4.8 reveal that there is a significant increase in the score for the skill of 'Dealing with Answers' (at the 0.001 level) after feedback through FLACS.
This shows that the Method of Feedback through FIACS as outlined in Chapter III is very much effective for the modification of the behaviour of the technical teachers in the skill of 'Dealing with Answers'.

The above finding is further supported by the fact that a vast majority of the subjects, namely 33 out of 36 Ss showed preference of Feedback through FIACS for developing the skill of 'Dealing with Answers' by giving rating scores of 4 and more (out of the maximum possible rating score of 9) with the group Mean of 7.08, and 34 out of 36 Ss expressed their opinions favouring the effectiveness of Feedback through FIACS for improving the skill of 'Dealing with Answers' by giving a rating score of 4 and more (out of the maximum possible rating score of 9) with the group Mean of 7.06.

THE SKILL OF 'REINFORCEMENT'

The results in Table 4.14 have revealed that there is a significant increase in the scores obtained by the Ss for (i) Positive verbal reinforcement (at the 0.001 level), (ii) Explanation of Student Answer/Talk (at the 0.05 level), (iii) Elaboration of Student Answer/Talk (at the 0.01 level), (iv) Variety in positive verbal reinforcement (at the 0.001 level), and (v) the 'Skill of Reinforcement' (at the 0.001 level), after feedback through FIACS, and that there is no significant effect on
(i) Positive non-verbal reinforcement, (ii) Criticism, and (iii) Repetition of Student Answer/Talk.

These results show that the 'Method of Feedback through FIACS' as outlined in Chapter III is very helpful to the student teachers in Microteaching sessions, for developing necessary skills to reinforce their student responses/initiatory talks, (i) verbally, through positive reinforcers like 'Good', 'Fine', etc, (ii) by explaining it, (iii) by elaborating upon it, and (iv) by introducing a variety of Positive verbal reinforcers. The results also show that this method of Feedback is not very helpful to the student teachers for developing necessary skills in them to reinforce their student responses or initiatory talks through (i) non-verbal positive reinforcers like 'smiling', 'nodding the head', etc, and (ii) by repeating it. Also, this feedback treatment does not seem to affect very much the behaviour of the student teachers in their criticism of student responses or initiatory talks. Lack of significant improvement in the use of non-verbal positive reinforcers under the skill of reinforcement after feedback through FIACS, might probably be due to the fact that in FIACS, there are only verbal categories and there is no provision for recording non-verbal behaviours.

But, since the increase in the scores for the 'skill of Reinforcement' was found to be statistically significant
at the 0.001 level, this method of feedback through FIACS is very much effective for bringing about the modification of the behaviour of the technical teachers in the 'skill of Reinforcement'.

The fact, that a vast majority of the subjects (that is 34 out of the total 36 Ss) have preferred Feedback through FIACS for developing the skill of reinforcement and expressed themselves in favour of its effectiveness for improving the skill of reinforcement by giving a rating score of 4 and more for each (out of the maximum possible rating score of 9) with the group Means of 7.08 and 7.19 respectively, amply supports the finding that Feedback through FIACS produces a significant improvement in the skill of Reinforcement, thereby modifying the behaviour of the technical teachers.

THE 'SKILL OF STIMULUS VARIATION'

Results from Table 4.20 reveal that there is a significant increase in the scores obtained by the Ss for (i) Catching the Attention of Students in the class (at the 1% level), (ii) Pauses (at the 0.001 level), and (iii) the 'skill of Stimulus Variation' (at the 5% level) after feedback through FIACS and that there is no significant effect on (i) Increasing Student Participation, (ii) Teacher Position, (iii) Teacher Movement, and (iv) Teacher Gestures.
These results show that the Method of Feedback through FIACS as outlined in Chapter III is very helpful for the student teachers in the Microteaching sessions to develop in them the skills of (i) Catching the Attention of the students in the class, and (ii) Introducing suitable pauses after teacher questions for all the students to think before actually speaking out the answer.

The results also show that this method of feedback is not very helpful for the modification of Technical Teacher Behaviour in Microteaching Sessions, as regards the skill of 'Increasing the student participation in the class', or 'Increasing the number of proper Teacher Positions and reducing the number of Improper Teacher Positions', or 'Making more purposeful Teacher Movements and reducing the number of unwanted Teacher Movements', or 'Increasing the number of proper Teacher Gestures and reducing the number of unwanted Teacher Gestures'. Since there is no provision in FIACS for recording and providing feedback for the non-verbal behaviours of the teacher in the class-room, it is quite natural that Feedback through FIACS cannot result in a significant improvement in the skills of Teacher Position, Teacher Movement, and Teacher Gestures which fall under the category of non-verbal Teacher behaviour.

But since the increase in the scores for the 'skill of Stimulus Variation' was found to be statistically
significant at the 5% level, this method of Feedback is no doubt effective for bringing about the modification of the behaviour of the technical teachers in their skill of Stimulus Variation.

The effectiveness of Feedback through F1ACS in the modification of the behaviour of the technical teachers in the skill of Stimulus Variation is also supported by the Reactions expressed by the Ss after the programme. The reactions expressed by the Ss in fact reveal that as many as 32 of them preferred Feedback through F1ACS for the development of the skill of Stimulus Variation and expressed favourably for its effectiveness in the improvement of the skill of Stimulus Variation by giving a rating score of 4 and above (out of the maximum possible rating score of 9) with the group Means of 6.06 and 6.19 respectively.

'OVERALL TEACHING PERFORMANCE'

The results in Table 4.25 have already shown that there is a significant increase in the scores obtained by the Ss for their overall teaching performance (at the 1% level) after feedback through F1ACS.

This shows that the Method of Feedback through F1ACS as outlined in Chapter III is quite effective in improving the overall teaching performance of technical teachers, as is evident from the statistically significant increase in the scores of the Ss for the overall Teaching performance
obtained after only one Microteaching Cycle of 115 minutes duration for each of the Ss.

A similar observation was made by Rajamony (1976) on Civil, Electrical and Mechanical Groups of Teacher Trainees admitted to the In-service teacher training programme in 1975 at the Technical Teachers' Training Institute, Chandigarh which also supports the above finding.

BEHAVIOUR MODIFICATION

The null hypothesis that 'Feedback through FIACS has no effect on the modification of technical teacher behaviour in microteaching sessions' does not stand good and it is rejected because of lack of evidence, and it has been proved that Feedback through FIACS has resulted in a significant improvement of the technical teacher behaviours in microteaching sessions with regard to,

(i) The skills of Asking more appropriate questions in their lessons (0.05 level), asking more clearly stated questions in their lesson (0.05 level), asking more purposeful questions in their lessons (0.05 level), asking more questions to the class in their lessons so as to involve all his students rather than putting questions either to individual students or not facing the class at all (.05 level), and questioning as a whole (0.01 level);

(ii) The skills of Dealing more properly with student answers (0.001 level), that is to say, the responses made by the students to teacher questions which means
communicating to the student verbally that the response was right (in the case of a completely right answer), or wrong (in the case of a completely wrong answer), or giving cues (in the case of a partially right answer) to help the student to arrive at the more correct answer;

(iii) The skills of Reinforcing the student answers or initiatory talks, verbally, through positive reinforces like 'Good', 'Fine', etc., (0.001 level), through explanation (0.05 level), through elaboration (0.01 level), through a variety of positive verbal reinforcements (0.001 level), and Reinforcement as a whole (0.001 level);

(iv) The skills of Catching more attention of his students in the class (0.01 level), introducing more Pauses after questions (0.001 level), Stimulus Variation as a whole (0.05 level); and

(v) The improvement of the overall teaching performance (0.01 level) in regular class-room lessons.

It becomes quite evident that Feedback through FIACS is significantly effective for the modification of technical teacher behaviour in the areas of Questioning, Dealing with Answers, Reinforcement, Stimulus Variation and Overall Teaching Performance in Class-room situations. The above finding that Feedback through FIACS is quite effective in
the modification of technical teacher behaviour is supported by the findings of Bhattacharya (1974) that microteaching and FIACS is more effective than conventional techniques in the development of indirect teacher behaviour, and Rajamony (1976) that Feedback through FIACS in microteaching sessions is quite effective in improving the teaching skills, and the overall teaching performance of Polytechnic teachers.

The high Group Mean Ratings of 6.78 and 7.06 (out of a maximum possible rating of 9) (See Table 4.69) given by the Ss towards (i) General effectiveness of Feedback through FIACS, and (ii) How far the training in Teaching skills through FIACS is helpful in their Polytechnic teaching, respectively further support this finding.

Results from Table 4.4 reveal that there is a significant increase in the scores obtained by the Ss for (i) Precision of questions (at the .1 level), (ii) Appropriateness of context of questions (at the .001 level), (iii) Clarity of questions (at the .001 level), (iv) Nature of questions (at the .001 level), (v) Technique of putting questions (at the .001 level), (vi) Variety of questions (at the .1% level), (vii) Purpose of questions (at the .001 level), and (viii) the skill of Questioning (at the .001 level) after feedback through ACTS and that there is no significant effect on the 'Number of questions' asked by the subject.

These results show that the 'Method of Feedback through ACTS as outlined in Chapter III is very much helpful for the student teachers in Microteaching Sessions, to

(i) increase the number of questions that are appropriate to the context in the lesson,
(ii) increase the number of precise questions asked by them in their lessons,
(iii) ask more clearly stated questions in the class,
(iv) ask more divergent questions in the class,
(v) develop the proper technique of putting questions in the class,
(vi) increase variety in their questions, and
(vii) ask more purposeful questions.
Also, it is evident from the results, that the method of feedback through ACTS though not very helpful for increasing the number of questions asked by the student teachers in Microteaching Sessions, it is very effective for bringing about the modification of the behaviour of technical teachers in their skill of Questioning as is evident from the high level of statistical significance (viz: 0.001 level) for the increase in the Mean of the scores obtained by the Ss for the skill of Questioning.

The fact that all the total 36 Ss have given a rating of 4 and more, with as many as 16 of them giving the maximum possible rating score of 9, with the group mean rating score of 7.64 showing their preference to Feedback through ACTS for developing the skill of Questioning, and that none of them have given a score less than 3 for the 'Effectiveness of feedback through ACTS in improving the skill of 'Questioning' with the group mean score of 7.47 (maximum possible score being 9) highly supports the finding that Feedback through ACTS is very effective in the modification of the technical teacher behaviour in the skill of Questioning in the intended direction.

The very high effectiveness of Feedback through ACTS on the skill of Questioning might probably be due to the fact, that in ACTS the Questioning Behaviour is analyzed
more thoroughly and that there is provision for recording and providing feedback on the different types of questions asked by a student teacher in microteaching sessions, namely the closed, open, descriptive, explanatory, elaborative, personal, evaluative, repeated, modified, and rhetorical questions which might help the student teachers to improve their questioning. McNaughton et al (1967) has also obtained a similar finding that a very large difference exists between the experimental teachers (who had been trained to ask those questions which would more likely stimulate pupils' thinking) and the control group. There is also a similar evidence in the studies of Gallagher (1965), Clegg, Farley and Curran (1967), Davis and Tinsley (1967), Farley and Clegg (1969), Crump (1970), Rogers (1972), and Chaudhari (1977) which revealed that training teachers in the knowledge and use of Bloom's taxonomy or in a similar form as modified by Sanders (1966) significantly increases the number of teacher questions at higher cognitive levels than others who do not have such a training.

THE 'SKILL OF DEALING WITH ANSWERS'

The results in Table 4.9 have revealed that there is a significant increase in the scores obtained by the Ss for the skill of Dealing with Answers (at the 0.001 level) after feedback through ACTS.
This shows that the 'Method of Feedback through ACTS' as outlined in Chapter III is very much effective for the modification of technical teacher behaviour in their 'skill of Dealing with Answers'.

The above finding is further supported by the fact that none of the 36 Ss has given a rating less than 5, with as many as 17 of them giving the maximum possible rating of 9 with a high group mean rating of 7.69 for their preference to Feedback through ACTS for developing the skill of 'Dealing with Answers', and the high group mean rating of 7.58 (out of the maximum possible rating score of 9) for the 'Effectiveness of Feedback, through ACTS in improving the skill of 'Dealing with Answers' given by them.

THE 'SKILL OF REINFORCEMENT'

Results from Table 4.16 have revealed that there is a significant increase in the scores obtained by the Ss for (i) Positive non-verbal reinforcement (at the 5% level), (ii) Repetition of Student Answer/Talk (at the 5% level), (iii) Explanation of Student Answer/Talk (at the 1% level), (iv) Elaboration of Student Answer/Talk (at the 5% level), and (v) the skill of Reinforcement (at the 0.001 level) after feedback through ACTS and that there is no significant effect on (i) Positive verbal reinforcement, (ii) criticism of Student Answer/Talk, and (iii) Variety in Positive verbal reinforcement.
These results show that the 'Method of Feedback through ACTS' as outlined in Chapter III is very helpful to the student teachers in microteaching sessions for developing necessary skills to reinforce their students' responses/initiatory talks, through

(i) positive non-verbal reinforcements,
(ii) repetition
(iii) explanation, and
(iv) elaboration.

The results also show that the method of feedback through ACTS is not very helpful for the student teachers in microteaching sessions for developing necessary skills in them to reinforce their student answers/initiatory talks through either positive verbal reinforcements, or a variety in their positive verbal reinforcements. Since Feedback through ACTS has not produced any significant improvement in the skill of using positive verbal reinforcements, it is quite natural that Feedback through ACTS cannot result in any significant improvement in the skill of using variety in the positive verbal reinforcements made by the technical teachers. The method of Feedback through ACTS also does not seem to have any effect on the behaviour of the student teachers in their criticism of students' responses or initiatory talks.

But since, the increase in the scores for the 'skill of Reinforcement' was found to be statistically significant
at 0.001 level, this method of Feedback is very much effective for bringing about the necessary modification of the behaviour of the technical teachers in the 'skill of Reinforcement'.

The fact that all the 36 Ss have shown preference to Feedback through ACTS for developing the 'skill of Reinforcement' by giving a rating ranging from 4 to 9 with as many as 15 of them giving the maximum possible rating of 9 (the group Mean rating being 6.69) and that all of them have rated for the item 'Effectiveness of Feedback through ACTS in improving the skill of Reinforcement' with scores ranging from 5 to 9 (the maximum possible rating score is 9) with a group Mean rating score of 7.56, add evidence to the finding that Feedback through ACTS is significantly effective in the modification of technical teacher behaviour in the skills of Reinforcement.

THE 'SKILL OF STIMULUS VARIATION'

Results in Table 4.22 have revealed that there is a significant increase in the scores obtained by the Ss for (i) Catching the Attention of Students in the class (at the 0.001 level), (ii) Pauses (at the 0.001 level), and (iii) the Skill of Stimulus Variation (at the 1% level) after feedback through ACTS and that there is no significant effect on (i) Student Participation, (ii) Teacher Position, (iii) Teacher Movement, and (iv) Teacher Gestures.
These results show that the 'Method of Feedback through ACTS' as outlined in Chapter III is very helpful for the student teachers in the microteaching Sessions to develop in them the skills of (i) Catching the attention of the students in the class, and (ii) Introducing suitable pauses after teacher questions for all the students to think before actually speaking out the answers.

The results also show that Feedback through ACTS is not very helpful for the modification of technical teacher behaviour in microteaching sessions, as regards the skill of 'Increasing the student participation in the class', or 'Increasing the number of proper Teacher Positions and reducing the number of improper Teacher Positions', or 'Making more purposeful Teacher movements and reducing the number of unwanted Teacher movements,' or 'Increasing the number of proper Teacher Gestures and reducing the number of unwanted Teacher Gestures'. Since there is no provision in ACTS, as in the case of FIACS, for recording and providing feedback for the non-Verbal behaviours of the teacher in the class-room it is quite natural and true that the method of feedback through ACTS cannot result in a significant improvement in the skills of Teacher position, Teacher Movement, and Teacher Gestures which fall under the Category of Non-Verbal teacher behaviours. It is also worth-noting that the method of Feedback through ACTS has
not produced any significant improvement in the behaviour of the technical teachers in their skill of increasing student participation as in the case of Feedback through FIACS, both the systems being based on the verbal behaviour in the classroom.

But since the increase in the scores for the 'Skill of Stimulus Variation' was found to be statistically significant at the 0.01 level, this method of Feedback through ACTS is really effective for bringing about the modification of the behaviour of the technical teachers in the skill of Stimulus Variation.

The above findings on the Effect of Feedback through ACTS in the modification of technical teacher behaviour are further supported by the fact that as many as 30 out of the total 36 Ss have expressed their preference to Feedback through ACTS for developing the skill of Stimulus Variation by giving ratings ranging from 5 to 9 with a group mean rating of 6.39, and as many as 33 out of the total 36 Ss expressing favourably for the item 'Effectiveness of the Feedback through ACTS in improving the skill of Stimulus Variation' by giving ratings ranging from 5 to 9 with a group mean rating of 6.64 (the maximum possible rating in each case being 9 only).

'OVERALL TEACHING PERFORMANCE'

Table 4.26 has already revealed that there is a
significant increase in the scores obtained by the Ss
for their overall teaching performance (at the 0.001 level)
after feedback through ACTS.

This shows that the Method of Feedback through ACTS
as outlined in Chapter III is very much effective in
improving the overall teaching performance of technical
teachers, as is evident from the highly significant
increase in the scores obtained by the Ss for their overall
teaching performance after one microteaching cycle of 115
minutes duration for each of the Ss.

A similar finding was obtained by Rajamony (1976)
on the 1975 batch of technical in-service teachers admitted
to the Technical Teachers' Training Institute, Chandigarh
for Training.

BEHAVIOUR MODIFICATION

The null hypothesis that 'Feedback through ACTS' has
no effect on the modification of technical teacher behaviour
in microteaching sessions' does not stand good and it is
rejected because of lack of evidence, while it has been
proved that Feedback through ACTS has resulted in a
significant improvement of the technical teacher behaviours
in microteaching sessions with regard to the improvement in,
(1) The skills of 'Asking more appropriate questions'
in their lessons (0.001 level), asking more precise
questions in their lessons (0.01 level), asking more
clearly stated questions in their lessons (0.001 level), asking more divergent questions in their lessons (0.001 level), asking a variety of questions in their lessons (0.01 level), asking more purposeful questions in their lessons (0.001 level), asking more questions to the class in their lessons so as to involve all his students rather than putting questions either to individual students or not facing the class at all (0.001 level), and Questioning as a whole (0.001 level);

(ii) The skills of Dealing more properly with student answers (0.001 level), that is to say the responses made by the students to teacher questions, which means communicating to the student verbally that the response was right (in the case of a completely right answer), or wrong (in the case of a completely wrong answer) or giving cues (in the case of a partially right answer) to help the student to arrive at the more correct answer;

(iii) The skills of Reinforcing student answers or initiatory talks through non-verbal positive reinforcers (0.05 level), through repetition (0.05 level), through explanation (0.01 level), through elaboration (0.05 level), and Reinforcement as a whole (0.001 level);
(iv) The skills of catching more attention of his students in the class (0.001 level), introducing pauses after questions (0.001 level), and Stimulus variation as a whole (0.01 level); and

(v) The overall teaching performance (0.001 level) in regular class-room lessons.

It becomes quite evident that Feedback through ACTS is significantly effective for the modification of technical teacher behaviour in the areas of Questioning, Dealing with Answers, Reinforcement, Stimulus Variation and Overall Teaching performance in class-room situations. This finding is in agreement with the earlier finding of Railmony (1976) that Feedback through ACTS is quite effective in improving the Teaching skills and the overall teaching performance of the technical teachers.

The fact that all the total 36 Ss expressed their reactions quite favourably for the 'General effectiveness of Feedback through ACTS' by giving ratings ranging from 4 to 9 (the maximum possible rating score being 9 only) with a group Mean rating of 7.39, and that 34 out of the total 36 Ss expressed their reactions favourably for the item 'How far the training in teaching skills through ACTS is helpful in their polytechnic teaching' by giving ratings ranging from 5 to 9 with a group Mean rating of 7.56 (the maximum possible rating score being 9 only) add support to the finding that feedback through ACTS produces a significant effect in the modification of the technical teacher behaviour.
The results in Table 4.6 reveal that there is a significant increase in the scores obtained by the Ss for (i) Appropriateness of context of questions (at the 5% level), (ii) Precision of questions (at the 5% level), (iii) Clarity of questions (at the 1% level), (iv) Nature of questions (at the 1% level), (v) Technique of putting questions (at the 1% level), (vi) Variety of questions (at the 5% level), (vii) Purpose of questions (at the 1% level), and (viii) the skill of Questioning (at the 1% level) after feedback through videotape, and that there is no significant effect on the number of questions.

These results show that the 'Method of Feedback through VT' as outlined in Chapter III is very helpful for the student teachers in Microteaching Sessions,

(i) to increase the number of questions which are appropriate to the context in the lesson,
(ii) to ask more precise questions,
(iii) to ask more clearly stated questions,
(iv) to ask more divergent questions,
(v) to develop the proper technique of putting questions in the class,
(vi) to ask a variety of questions, and
(vii) to ask more purposeful questions.
The results also show that feedback through VT is not very helpful for the student teachers in microteaching sessions to increase the number of questions asked by them.

But since the increase in the scores for the 'skill of Questioning' was found to be statistically significant at the 1% level, this method of Feedback through VT is quite effective for bringing about the modification of the behaviour of the technical teachers in the skill of questioning.

The fact that 34 out of the total 36 Ss have preferred feedback through VT for developing the skill of Questioning by giving a rating score ranging from 4 to 9 (the maximum possible rating score) with a group Mean rating of 7.17 and that the same number of Ss have expressed favourable reactions towards 'Effectiveness of Feedback through VT in improving the skill of Questioning' by giving ratings ranging from 4 to 9 (the maximum possible rating score) with a group Mean rating of 7.28, provides further evidence for the finding that Feedback through VT produces a significant effect on the technical teacher behaviour in the skill of questioning.

Although the method of feedback is different, a similar finding on the effect of videotape in improving the skill of questioning is revealed by Orme (1966), who found in an
experiment on teacher's use of probing questions, that perceptual modelling (that is videotape) lead to significantly greater gains than symbolic modelling and that viewing a symbolic model and one's own teaching performance with a supervisor providing discrimination training is the most effective treatment, but Allen, et al (1967) and Das et al (1977) did not find any significant difference between the use of perceptual and symbolic modelling and this might probably be due to the supervisor's role during feedback sessions. This can readily be seen from the observation of Claus (1968) that supervisor added nothing to the effectiveness on teacher's use of higher order questioning during VT feedback.

THE 'SKILL OF DEALING WITH ANSWERS'

The results from Table 4.2 reveal that there is a significant increase in the scores obtained by the Ss for the skill of Dealing with Answers (at the 1% level) after feedback through videotape.

This shows that the Method of Feedback through VT as outlined in Chapter III is quite effective for the modification of the behaviour of the technical teachers in the skill of 'Dealing with Answers'.

There is also evidence for the above finding in the reactions expressed by the Ss after undergoing the training, that all the 36 Ss have expressed their preference to Feedback
through VT for developing the skill of 'Dealing with Answers' by giving ratings ranging from 5 to 9 (the maximum possible rating score) with the group Mean rating of 7.56 and that all but 2 of them have expressed very favourably toward the item 'Effectiveness of Feedback through VT in improving the skill of 'Dealing with Answers' by giving ratings ranging from as high as 6 to the maximum possible rating score of 9, with the group Mean rating of 7.39.

THE 'SKILL OF REINFORCEMENT'

The results from Table 4.18 have revealed that there is a significant increase in the scores obtained by the Ss for (i) Positive verbal reinforcement (at the 1% level), (ii) Positive non-verbal reinforcement (at the 0.001 level), (iii) Repetition of Student Answer/Talk (at the 1% level), (iv) Elaboration of Student Answer/Talk (at the 5% level), (v) Variety in positive verbal reinforcement (at the 0.001 level), and (vi) the skill of Reinforcement (at the 0.001 level) after feedback through videotape and that there is no significant effect on (i) criticism of Student Answer/Talk, and (ii) Explanation of Student Answer/Talk.

These results show that the 'Method of Feedback through VT' outlined in Chapter III is very helpful to the student teachers in microteaching sessions for developing
necessary skills to reinforce their student responses/initiatory talks,

(i) Verbally, through positive reinforcers like 'Good', 'Fine', etc.
(ii) through non-verbal positive reinforcers like 'Smiles', 'Nodding the head', etc.
(iii) through repetition,
(iv) through elaboration, and
(v) by introducing a variety of Positive verbal reinforcers.

The results also show that this method Feedback is not very helpful to the student teachers for developing necessary skills in them to reinforce their student responses or initiatory talks through explanation. Also, Feedback through VT does not seem to affect very much the behaviour of the student teachers in their criticism of student responses or initiatory talks. A significant improvement in both verbal and non-verbal reinforcing behaviours of the Ss may be attributed to the advantage of using the videotape that it can provide visual feedback also.

But since the increase in the scores for 'the skill of Reinforcement' was found to be statistically significant at the 0.001 level, this method of Feedback through VT is very much effective for bringing about the modification of the behaviour of the technical teachers in the skill of Reinforcement.
The above finding is further supported by the fact that all the 36 Ss have expressed their preference to Feedback through VT for developing the skill of 'Reinforcement' and favourably towards the item 'Effectiveness of Feedback through VT in improving the skill of 'Reinforcement' by giving ratings ranging from 4 to 9 (the maximum possible rating score) with the group mean ratings of 7.56 and 7.33 respectively for the two items.

The 'SKILL OF STIMULUS VARIATION'

The results in Table 4.24 reveal that there is a significant increase in the scores obtained by the Ss for (i) Catching the Attention of Students in the class (at the 0.001 level), (ii) Student participation (at the 5% level), (iii) Pauses (at the 0.001 level), (iv) Teacher Position (at the 0.001 level), (v) Teacher Movement (at the 0.001 level), (vi) Teacher Gestures (at the 0.001 level), and (vii) the Skill of Stimulus variation (at the 0.001 level) after feedback through Videotape.

These results show that the Method of Feedback through VT as outlined in Chapter III is very much helpful for the student teachers in the Microteaching sessions to develop in them the skills of:

(i) Catching more attention of the students in the class,

(ii) Increasing student participation in the class-room teaching-learning process,
(iii) Introducing suitable pauses after teacher questions so that all the students can think before actually speaking out the answers,

(iv) Increasing the number of proper Teacher positions, while simultaneously reducing the number of improper Teacher positions,

(v) Making more purposeful Teacher Movements, while simultaneously reducing the number of unwanted Teacher Movements,

(vi) Increasing the number of proper Teacher Gestures, and simultaneously reducing the number of unwanted Teacher Gestures, and

(vii) Stimulus variation as a whole.

Since the increase in the scores for the skill of Stimulus variation and the various subskills under it, were found to be statistically significant beyond the 0.001 level except in the case of student participation which was found to be significant at the 0.05 level, Feedback through VT is very much effective for bringing about the necessary modification of behaviour of the technical teachers in the skill of stimulus variation.

The above finding has adequate support from the reactions expressed by the Subjects after the training programme that all the 36 Ss have expressed their preference to Feedback through VT for developing the skill of 'Stimulus Variation' and opined favourably towards the
'Effectiveness of feedback through VT in improving the skill of 'Stimulus Variation' by giving high ratings ranging from 4 to 9 (the maximum possible rating score) with the group mean ratings of 7.64 and 7.33 respectively for the two items.

'OVERALL TEACHING PERFORMANCE'

Results from Table 4.27 have revealed that there is a significant increase in the scores obtained by the Ss for their overall teaching performance (at the 0.001 level) after feedback through Videotape.

This shows that the Method of Feedback through VT as outlined in Chapter III is very much effective in improving the overall teaching performance of technical teachers, as is evident from the highly significant increase in the scores obtained by the Ss for their overall teaching performance after one microteaching cycle of 115 minutes duration for each of the Ss.

A similar finding was obtained by Rajamony (1976) on the 1975 batch of In-service polytechnic teachers admitted to the Technical Teachers' Training Institute, Chandigarh for training.

There is also adequate support for the Effect of Feedback through VT in improving the overall teaching performance of the technical teachers in the studies of
Webb and Baird (1967) who found that those who received student feedbacks and videoplay-back improved significantly in their teaching performance.

BEHAVIOUR MODIFICATION

The null hypothesis that 'Feedback through VT has no effect on the modification of technical teacher behaviour in microteaching sessions' does not stand good as in the case of other two hypotheses about Feedback through FLACS and ACTS and it is rejected because of lack of evidence. On the contrary it has been proved that Feedback through VT has resulted in a significant improvement of the technical teacher behaviour in micro-teaching sessions with regard to:

(i) the skills of Asking more appropriate questions in their lessons (0.05 level), asking more precise questions in their lessons (0.05 level), asking more Purposeful and more clearly stated questions in their lessons (0.01 level), asking more divergent questions in their lessons (0.01 level), asking a variety of questions in their lessons (0.05 level), asking more questions to the class in their lessons so as to involve all his students rather than putting questions either to individual students or not facing the class (0.01 level), and Questioning as a whole (0.01 level);
the skills of Dealing more properly with student answers (0.01 level);

the skills of Reinforcing the student answers or initiatory talks through positive verbal reinforcers like 'Good', 'Fine', etc., (0.01 level), through positive non-verbal reinforcers like 'Smiles', 'Nodding head', etc. (0.001 level), through repetition (0.01 level), through elaboration (0.05 level), through variety of Positive verbal reinforcers (0.001 level), and Reinforcement as a whole (0.001 level);

the skills of Catching more attention of his students in the class (0.001 level), Increasing student participation in the class (0.05 level), Introducing suitable pauses after questions (0.001 level), Increasing the number of proper Teacher Positions (0.001 level), Making more purposeful Teacher Movements (0.001 level), Increasing the number of proper Teacher Gestures (0.001 level), and stimulus Variation as a whole (0.001 level); and

the improvement of the Overall Teaching Performance (0.001 level) in regular class-room lessons.

It becomes quite evident that Feedback through VT is significantly effective for the modification of technical teacher behaviour in the areas of Questioning, Dealing with Answers, Reinforcement, Stimulus Variation and Overall Teaching performance in the intended direction.
The above finding has further support in the reactions expressed by the subjects that, all but one of them expressed very favourably for the 'General Effectiveness of Feedback through VT' by giving ratings of 5 and more with as many as 20 of them (about 56% of the Ss) giving the maximum possible rating score of 9 (the group Mean rating being 8.11, the highest), and for the item 'How far the training in Teaching skills through VT is helpful in their polytechnic teaching' by giving ratings of 4 and more with as many as 21 of them (about 58% of the Ss) giving the maximum possible rating score of 9 (the group Mean rating being 7.69).

The method of Feedback through VT as outlined in Chapter III has the provisions of both Peer group and Supervisor (Teacher observer) comments in addition to Self-observation by the Concerned practising teacher. Although the earlier studies of Acheson (1964) and others reveal that pupil participation did not differentiate the treatment groups, later studies of Tuckman and Oliver (1968), Morse and Davis (1970), and many others add support for the effectiveness of Peer group feedback. The studies of Salomon and MacDonald (1969), Doty (1970), Morse, Kysilka and Davis (1970), Young (1970) and McIntyre (1971), all reveal that supervisor feedback is essential. The effectiveness of Feedback through VT for the modification of Technical Teacher behaviour toward the intended direction in the present investigation might probably be due to all the three components of one's own
self-observation, supervisory feedback and peergroup feedback, and the observed finding is in complete agreement with the reported finding of Perlberg and O'Bryant (1969) that 'adequate videotape feedback may motivate and facilitate modification of teacher behaviour'.

There is also evidence in the Studies conducted on the in-service student teachers in the School district of Utah which revealed a tremendous potential for micro-teaching (including videotaping) for changing the behaviour of teachers as also in the studies conducted by Davis (1969) and Rutherford (1971).

A COMPARISON OF FEEDBACKS

SKILL OF QUESTIONING

It has been shown by the results of analysis of variance of the Feedback Effect scores of FLACS, ACTS and VT for the various items under the skill of Questioning, that between the three kinds of treatments,

(i) there is a significant difference for the items, 'Clarity of questions' (0.10 level), 'Nature of questions' (0.05 level) and 'Technique of Putting questions' (0.10 level), and that

(ii) there is no significant difference for the items, Number of questions, Appropriateness of context of questions, Precision of questions, Variety in questions, Purpose of questions and the skill of Questioning.

The levels of significance for the various items under the skill of Questioning for the three kinds of feedback are summarised in the table 5.1.
TABLE 5.1

LEVELS OF SIGNIFICANCE FOR THE VARIOUS ITEMS UNDER THE SKILL OF QUESTIONING
FOR THE THREE KINDS OF FEEDBACK

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Item</th>
<th>Level of Significance</th>
<th>Of Difference between means</th>
<th>Between Feedback means (FIACS, ACTS &amp; VT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>For Feedback through</td>
<td>FIACS &amp; ACTS &amp; VT</td>
<td>F-value</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FIACS</td>
<td>ACTS</td>
<td>VT</td>
</tr>
<tr>
<td>1</td>
<td>Appropriateness of Context of Questions</td>
<td>0.05</td>
<td>0.001</td>
<td>0.05</td>
</tr>
<tr>
<td>2</td>
<td>Precision of Questions</td>
<td>N.S.</td>
<td>0.01</td>
<td>0.05</td>
</tr>
<tr>
<td>3</td>
<td>Clarity of Questions</td>
<td>0.05</td>
<td>0.001</td>
<td>0.01</td>
</tr>
<tr>
<td>4</td>
<td>Nature of Questions</td>
<td>N.S.</td>
<td>0.001</td>
<td>0.01</td>
</tr>
<tr>
<td>5</td>
<td>Technique of Putting Questions</td>
<td>0.05</td>
<td>0.001</td>
<td>0.01</td>
</tr>
<tr>
<td>6</td>
<td>Variety of Questions</td>
<td>N.S.</td>
<td>0.01</td>
<td>0.05</td>
</tr>
<tr>
<td>7</td>
<td>Purpose of Questions</td>
<td>0.05</td>
<td>0.001</td>
<td>0.01</td>
</tr>
<tr>
<td>8</td>
<td>No.of Questions</td>
<td>N.S.</td>
<td>N.S.</td>
<td>N.S.</td>
</tr>
<tr>
<td>9</td>
<td>Skill of Questioning</td>
<td>0.01</td>
<td>0.001</td>
<td>0.01</td>
</tr>
</tbody>
</table>

N.S. = Not Significant.
Although no significant differences between Feedback Means were obtained for the items 'Appropriateness of context of questions' and 'Precision of Questions' for the three kinds of treatments, the above table indicates that Feedback through ACTS seems to be definitely better than either Feedback through FIACS or Feedback through VT for improving the skill of asking more questions that are both appropriate to the context in the lesson and precise. This is revealed by the higher levels of significance of the improvement scores for both the items obtained by Feedback through ACTS, viz., 0.001 and 0.01 levels, compared with 0.05 and 0.05 levels for the first item for Feedback through FIACS and VT respectively and 0.05 level for the second item for Feedback through VT. In the case of Feedback through FIACS, the t-value obtained was found to be not significant for the item 'Precision of questions'. Among the treatments, the obtained t-value was slightly higher (2.642) (Table 4.6) for feedback through VT than for Feedback through FIACS (2.005) (Table 4.2) for the item 'appropriateness of context of questions'. Also Tables 5.1 and 4.30 reveal that the difference between Mean Feedback Effect scores of FIACS (2.11) and ACTS (4.00) is significant at 0.10 level for the item, 'Appropriateness of context of questions'. These seem to indicate that for improving the skills of asking more questions that are precise and appropriate to the context in a class-room lesson the method of Feedback through ACTS as outlined in Chapter III
is better followed by Feedbacks through VT and FIACS respectively in the order given.

For the items 'Clarity of questions', 'Nature of questions', and 'Technique of putting questions', significant differences between Feedback Means for the three kinds of treatments were obtained at 0.10, 0.05, and 0.10 levels respectively. Also Table 5.1 shows that the levels of significance of t-values for the above three items is higher in the case of Feedback through ACTS (0.001, 0.001 and 0.001 levels) than in the case of either Feedback through VT (0.01, 0.01 and 0.01 levels) or Feedback through FIACS (0.05, N.S., and 0.05 levels). For items 'Clarity' and 'Nature of questions', Tables 5.1., 4.33 and 4.35 reveal that the difference between Mean Feedback Effect scores of FIACS (2.14 and 1.64 respectively) and ACTS (4.53 and 4.39 respectively) are significant at 5% and 1% level respectively. Also, for the item 'Technique of putting questions', the difference between Mean Feedback Effect scores of FIACS (4.97) and ACTS (9.61), and VT (4.25) and ACTS (9.61) both are significant at 0.05 levels (vide tables 4.37 and 5.1). These results do reveal that for improving the skills of asking more clear and divergent questions and for improving the skill of putting questions to the class facing his students (than to individual students and to avoid putting questions without facing his class) the method of feedback through ACTS as outlined in Chapter III is the best followed by Feedbacks through VT and FIACS respectively in the order given.
In the case of two of the items 'Variety of Questions', and 'Purpose of Questions', although no significant differences were obtained between Feedback Means for the three kinds of treatments, Table 5.1 shows that the levels of significance of the t-values for the above two items are higher in the case of Feedback through ACTS (namely, 0.01 and 0.001 levels) than in the case of either Feedback through VT (0.05 and 0.01 levels) or Feedback through FIACS (N.S. and 0.05 levels). Besides the difference between Means (FIACS and ACTS) was found to be significant at 0.10 level for the item 'Purpose of questions'. These results seem to suggest that Feedback through VT is slightly superior to the Feedback through FIACS in the case of the above items under the skill of Questioning. Hence, for improvement in the skills of asking 'a variety of questions' and more 'Purposeful questions', the method of Feedback through ACTS as outlined in Chapter III seems to be better than both Feedbacks through VT and FIACS, the latter seems to be the least effective.

For the item 'Number of Questions', neither the t-values obtained for Feedbacks through ACTS, VT and FIACS are significant, nor was there any significant difference between the Feedback Means of the three kinds of treatments as is revealed by Table 5.1. The obtained t-values are 0.991, 1.572, and 1.640 (Tables 4.2, 4.4, and 4.6 respectively) in the case of Feedbacks through FIACS, ACTS and VT respectively. Although the results indicate that neither of the three
treatments is effective in producing a significant improvement in the skill of asking more number of questions, the methods of Feedback through VT and ACTS as outlined in Chapter III ($t = 1.640$ and $t = 1.572$ respectively) seem to have a slight edge over Feedback through FIACS ($t = 0.991$). The above finding was probably due to the fact that technical teachers in general have asked quite a good number of questions (not less than 10 on an average) in each of the 10-minute micro lessons.

For the overall improvement of the skill of questioning, although no significant difference between the Feedback Means for the three kinds of treatments was obtained, Table 5.1 indicates that the level of significance of the $t$-value obtained in the case of Feedback through ACTS is much higher (0.001 level) than in the case of either Feedbacks through VT or FIACS (both 0.01 levels). Also Tables 4.6 and 4.2 reveal that the obtained $t$-values are 3.297 and 2.999 for Feedbacks through VT and FIACS respectively while for the Feedback through ACTS, the obtained 't' value was 3.653 (Table 4.4) and the difference between Means (FIACS and ACTS) was found to be significant at 0.10 level. These results indicate that although there is no significant difference between the three kinds of treatments, the method of Feedback through ACTS as outlined in Chapter III is more effective for the overall improvement of the 'skill of questioning', followed by the methods of Feedback through VT and FIACS in the order mentioned.
Skill of Dealing with Answers

The results of analysis of variance of the Feedback Effect scores of FIACS, ACTS, and VT for the skill of Dealing with Answers have indicated that there is no significant difference between the three kinds of Feedback treatments.

Although no significant difference between the Feedback Means for the three kinds of treatments was obtained for the 'skill of Dealing with Answers', Table 5.2 given on the next page shows that the obtained t-values for Feedbacks through FIACS (4.794 from Table 4.8) and ACTS (3.855 from Table 4.10) were both found to be significant at 0.001 level, while the obtained t-value for Feedback through VT was found to be significant only at the 0.01 level.

The results do indicate that the method of Feedback through FIACS as outlined in Chapter III is slightly more effective than the method of Feedback through ACTS in improving the skill of Dealing with Answers and that Feedback through VT was found to be the least effective, when compared with the other two kinds of Feedbacks.
TABLE - 5.2

LEVELS OF SIGNIFICANCE FOR THE SKILL OF DEALING WITH ANSWERS FOR THE THREE KINDS OF FEEDBACK

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Item</th>
<th>Level of Significance</th>
<th>Between Feedback Means (FIACS, ACTS and VT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>For feedback through</td>
<td>Of difference between Means</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FIACS</td>
<td>ACTS</td>
</tr>
<tr>
<td>1.</td>
<td>Dealing with Student Answers</td>
<td>0.001</td>
<td>0.001</td>
</tr>
</tbody>
</table>

N.S. = Not significant.
SKILL OF REINFORCEMENT

It has already been shown by the results of analysis of Variance of the Feedback Effect Scores of FIACS, ACTS and VT for the various items under the skill of Reinforcement, that between the three kinds of treatments,

(i) there is a significant difference only for two of the items, namely 'Positive verbal' (0.05 level), and 'Positive non-verbal' (0.10 level) reinforcements, and that

(ii) there is no significant difference for the items, criticism, Repetition, Explanation and Elaboration of Student Answer/initiatory talk, Variety in Positive Verbal reinforcement and the skill of Reinforcement.

The levels of significance for the various items under the skill of Reinforcement for the three kinds of feedback are summarised in the table 5.3.

For the items, 'Positive verbal' and 'Positive non-verbal' reinforcements, significant differences between Feedback Means were obtained for the three kinds of treatments at 0.05 and 0.10 levels respectively. For positive verbal reinforcement, the level of significance of the t-value obtained for Feedback through FIACS was much higher (0.001 level) than for Feedback through VT (0.01 level) while the obtained t-value in the case of Feedback through ACTS was not significant at all.
<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Item</th>
<th>Level of Significance</th>
<th>Between Feedback Means (FIACS, ACTS, VT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>For Feedback through</td>
<td>Of Difference between Means</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FIACS</td>
<td>ACTS</td>
</tr>
<tr>
<td>1.</td>
<td>Positive verbal reinforcement</td>
<td>0.001</td>
<td>N.S.</td>
</tr>
<tr>
<td>2.</td>
<td>Positive Non-Verbal reinforcement</td>
<td>N.S.</td>
<td>0.05</td>
</tr>
<tr>
<td>3.</td>
<td>Criticism of student Answer/Initiatory talk</td>
<td>N.S.</td>
<td>N.S.</td>
</tr>
<tr>
<td>4.</td>
<td>Repetition of Student Answer/Initiatory talk</td>
<td>N.S.</td>
<td>0.05</td>
</tr>
<tr>
<td>5.</td>
<td>Explanation of Student Answer/Initiatory talk</td>
<td>0.05</td>
<td>0.01</td>
</tr>
<tr>
<td>6.</td>
<td>Elaboration of Student Answer/Initiatory talk</td>
<td>0.01</td>
<td>0.05</td>
</tr>
<tr>
<td>7.</td>
<td>Variety in Positive Verbal reinforcement</td>
<td>0.001</td>
<td>N.S.</td>
</tr>
<tr>
<td>8.</td>
<td>Skill of reinforcement</td>
<td>0.001</td>
<td>0.001</td>
</tr>
</tbody>
</table>

N.S. = Not Significant.
Also, the difference between Mean Feedback Effect scores of FIACS (3.61) and ACTS (1.08) was found to be statistically significant at 0.05 level (vide Tables 3.3, and 4.45). For positive non-verbal reinforcement, although both Feedbacks through ACTS and VT seem to be better than Feedback through FIACS, the level of significance of the obtained t-value for Feedback through VT was the highest (0.001 level) followed by ACTS (0.05), while the t-value obtained was not significant in the case of Feedback through FIACS. This may probably be due to the fact, that in the case of Feedback through VT, there is the possibility of observing one's own non-verbal behaviours also through the videotape playback and this facility is absent in both FIACS and ACTS as these systems are based on verbal behaviours only.

The results no doubt reveal that Feedback through FIACS is superior for improving the skill of positive verbal reinforcement and Feedback through VT is superior for improving the skill of positive non-verbal reinforcement. Also, while Feedbacks through VT and ACTS are somewhat effective for improving the skill of 'Positive verbal' and 'Positive non-verbal' reinforcements respectively, Feedbacks through ACTS and FIACS are not at all effective in producing any significant improvement, in the skills of 'Positive verbal' and 'Positive non-verbal' reinforcements respectively.
In the case of the item 'criticism of student Answer/Initiatory talk', neither the t-values obtained for Feedbacks through FIACS, ACTS and VT were found to be significant, nor was there any significant difference between Feedback Means for the three kinds of treatments. These results no doubt reveal that none of the three kinds of Feedbacks under investigation can significantly reduce the criticizing behaviour of student teachers in microteaching sessions. But Tables 4.18, 4.16 and 4.14 do suggest that Feedback through VT has a slight edge ($t = 1.668$) over both the Feedbacks through FIACS ($t = 1.436$) and ACTS ($t = 0.237$). The above finding was probably due to the fact that technical teachers have generally very little tendency to criticize their students' answers or initiatory talks.

Table 5.3 also shows that for the remaining items, 'Repetition', 'Explanation', and 'Elaboration' of student answer/initiatory talk, 'Variety in Positive verbal reinforcement', and the overall 'skill of Reinforcement', no significant differences between Feedback Means for the three kinds of treatments were obtained. But as the levels of significance of the obtained t-values in the case of Feedbacks through VT and ACTS are higher for the items 'Repetition' and 'Explanation' respectively (viz., 0.01 levels) than in the case of either Feedbacks through ACTS and FIACS (viz., 0.05 level ) and Feedbacks through FIACS and VT (N.S.) for the two items respectively, they seem to indicate that for improving the skills of reinforcement through 'Repetition' and 'Explanation' of Student Answers or
Initiatory Talks, the methods of Feedback through VT and ACTS respectively as outlined in Chapter III are more effective. The results also seem to indicate that for improving the skill of Repetition, Feedback through ACTS is somewhat effective while Feedback through FIACS is not at all effective and for improving the skill of Explanation, Feedback through FIACS is somewhat effective while Feedback through VT is not at all effective.

For the item 'Elaboration', the level of significance of the obtained t-value in the case of Feedback through FIACS is higher (0.01 level) than in the case of both Feedbacks through ACTS and VT (0.05 levels). In the case of Feedbacks through ACTS and VT, the t-values were found to be 2.242 (Table 4.16) and 2.148 (Table 4.18) respectively. These results indicate that for improving the skill of reinforcement through 'Elaboration of Student Answer/Initiatory talks', the method of Feedback through FIACS as outlined in Chapter III seems to be more effective than the other two kinds of Feedbacks and that Feedback through ACTS has a slight edge over Feedback through VT.

For the item 'Variety in Positive Verbal reinforcement', the obtained t-value was not found to be significant in the case of Feedbacks through ACTS, while for the other two kinds of Feedback, namely through FIACS and VT, both the t-values were found to be significant at the 0.001 levels.
These no doubt indicate that for improving the skill of reinforcement through a 'variety in Positive Verbal reinforcements', Feedback through ACTS is not at all effective, while both the Feedbacks through FIACS and VT seem to be equally effective. But the results from Table 4.14 and 4.15 seem to suggest that Feedback through FIACS has a slight edge (t = 5.199) over Feedback through VT (t=4.309) for improvement in the skill of 'Variety in Positive Verbal reinforcement'. Table 5.3 shows that although no significant difference between the Means for the three kinds of treatments for the overall skill of Reinforcement was seen, the obtained t-values for all the three kinds of Feedbacks were found to be significant at very high levels, viz., 0.001 levels. This no doubt reveals that all the three kinds of Feedbacks are equally effective in improving the overall skill of Reinforcement. But Tables 4.14, 4.16 and 4.18 seem to suggest that Feedback through FIACS has a slight edge (t = 5.348) over both the Feedbacks through ACTS (t = 5.020) and VT (t = 3.995).

SKILL OF STIMULUS VARIATION

The results of analysis of variance of the Feedback Effect Scores of FIACS, ACTS and VT for the various items under the skill of Stimulus Variation have indicated
that between the three kinds of treatments,

(i) there is a significant difference for the items, 'Catching the Attention of students' (0.10 level), 'Teacher Position' (0.001 level), 'Teacher Movement' (0.001 level), 'Teacher Gestures' (0.001 level), and the 'skill of Stimulus Variation' (0.001 level) and that,

(ii) for the remaining two items, namely student participation and pauses, there is no significant difference.

The levels of significance for the various items under the skill of 'Stimulus Variation' for the three kinds of Feedback are summarised in the table 5.4.

For the item 'catching the Attention of Students', significant difference between Feedback Means for the three kinds of treatments was obtained, but only at 0.10 level and the levels of significance of the obtained t-values for Feedbacks through FIACS, ACTS and VT were found to be 0.01, 0.001, 0.001 levels respectively. Although the t-values for both the Feedbacks through ACTS and VT were found to be significant at the 0.001 levels, the t-value in the case of VT was found to be higher (4.303 from Table 4.24) than in the case of ACTS (4.178 from Table 4.22). Also the difference between Feedback Means of FIACS (1.69) and VT (7.24), and ACTS (3.83) and VT (7.24), (vide Table 4.55) were found to be significant at 0.1% and 5% levels respectively (Table 5.4).
### Levels of Significance for the Various Items Under the Skill of 'Stimulus Variation' for the Three Kinds of Feedback

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Item</th>
<th>Level of Significance</th>
<th>Between Feedback Means (FIACS, ACTS and VT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>For Feedback through</td>
<td>of Difference between Means</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FIACS</td>
<td>ACTS</td>
</tr>
<tr>
<td>1.</td>
<td>Catching the Attention of Students</td>
<td>0.01</td>
<td>0.001</td>
</tr>
<tr>
<td>2.</td>
<td>Student Participation</td>
<td>N.S.</td>
<td>N.S.</td>
</tr>
<tr>
<td>3.</td>
<td>Pauses</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>4.</td>
<td>Teacher Position</td>
<td>N.S.</td>
<td>N.S.</td>
</tr>
<tr>
<td>5.</td>
<td>Teacher Movement</td>
<td>N.S.</td>
<td>N.S.</td>
</tr>
<tr>
<td>6.</td>
<td>Teacher Gestures</td>
<td>N.S.</td>
<td>N.S.</td>
</tr>
<tr>
<td>7.</td>
<td>Skill of Stimulus Variation</td>
<td>0.05</td>
<td>0.01</td>
</tr>
</tbody>
</table>

N.S. = Not Significant.
These results no doubt indicate that the method of Feedback through VT as outlined in Chapter III is superior to the method of Feedback through ACTS for improving the skill of 'Catching the Attention of Students in class', followed by Feedback through FIACS which is no doubt less effective than the former.

For the two items, 'Student participation' and 'Pauses', no significant differences between the Feedback Means for the three kinds of treatments were obtained which indicate that all the treatments are equally effective for the modification of technical teacher behaviour in respect of these two skills. For the item 'Student participation', only in the case of Feedback through VT, the t-value was found to be significant (0.05 level), whereas for the item 'Pauses', all the three kinds of Feedback were found to be significant at a high level of 0.001. Tables 4.20 and 4.22 show that the obtained t-values are 1.187 and 0.849 in the case of Feedbacks through FIACS and ACTS respectively for the first item 'Student Participation', while the obtained t-values for feedbacks through FIACS, ACTS and VT for the second item 'Pauses' were found to be 3.693 (Table 4.20), 4.149 (Table 4.22) and 5.039 (Table 4.24) respectively. These results do suggest that for the development of the skill of increasing student participation, the method of Feedback through VT as outlined in Chapter III is the only effective treatment followed
by the other two kinds of treatments (Feedback through ACTS being the least effective) and for improving the skill of 'Pauses' Feedback through VT again seems to the best followed by Feedbacks through ACTS (as the difference between Mean Feedback Effect scores is significant at 0.10 level) and FIACS in the order given.

For all the three non-verbal behaviour items, viz., 'Teacher position', 'Teacher Movement', and 'Teacher Gestures', neither Feedback through FIACS nor Feedback through ACTS could produce a significant improvement (even at the 0.10 level), whereas Feedback through VT could produce a significant improvement even beyond the 0.001 level. Also that highly significant differences (0.001 levels) between Feedback Means for the three kinds of treatments for all the above three items were obtained. Tables 4.10, 4.62, and 4.64 show that the Mean Feedback Effect scores for FIACS, ACTS, and VT are respectively 6.57, 8.04, and 40.12 for Teacher position, 7.38, 7.29, and 42.35 for Teacher Movement, and 3.91, 4.94, and 44.32 for Teacher Gestures. These strongly indicate beyond any doubt that the method of Feedback through VT as outlined in Chapter III is the only most effective treatment for improving the skills of 'Teacher Position', 'Teacher Movement', and 'Teacher Gestures'. In the absence of Feedback through VT, Feedback through ACTS seems to be better for improving the skills of Teacher Position,
Teacher Movement and Teacher Gestures (the obtained t-values are 1.823, 1.608 and 1.150 respectively, vide Table 4.22) than Feedback through FIACS (the obtained t-values are 1.427, 1.063 and 0.714 respectively, vide table 4.20).

For the Overall improvement of the skill of 'Stimulus Variation', a highly significant difference (0.001 level) between the Feedback means for the three kinds of treatments was obtained and Feedbacks through FIACS, ACTS and VT were found to produce a significant improvement at 0.05, 0.01, and 0.001 levels respectively. Also the difference between Mean Feedback Effect scores of VT (25.42) and ACTS (8.60), and VT (25.42) and FIACS (6.64) both (vide table 4.66), were found to be significant at 0.001 level. These results very strongly suggest that the method of Feedback through VT as outlined in Chapter III is the most effective treatment for improving the skill of 'Stimulus Variation' and followed by Feedbacks through ACTS and FIACS (which are also effective no doubt) in the order mentioned.

From the above discussion it clearly follows that Feedback through VT is the most effective treatment for improving all the components of the skills of Stimulus Variation and that for improving the non-verbal behaviour components of the skill of Stimulus Variation such as 'Teacher Position', 'Teacher Movements', and 'Teacher Gestures', Feedback through VT seems to be the one and only most
effective treatment. This might probably be due to the fact that videotape feedback produces greater awareness and insight (Goodkind, 1968), and that it may motivate and facilitate modification of Teacher behaviour (Perlberg and O'Bryant, 1969). There is also enough supporting evidence in McDonald and Allen (1967), McDonald (1968), Johnson (1969), Flanders (1970), McAleese and Unwin (1971b), Griffiths (1972), Stones and Morris (1972), and Dosajh (1974b) who had found that supervisor prompting and videotape replay as very effective in the acquisition of a teaching skill.

**Overall Teaching Performance**

The results of analysis of variance of the Feedback Effect Scores of FIACS, ACTS and VT for the overall Teaching Performance presented in Table 4.67 have indicated that there is a significant difference between the three kinds of treatments at the 0.05 level.

The table 5.5 shows that while feedback through FIACS could produce a significant improvement in the overall Teaching Performance of the Technical Teachers only at 0.01 level, Feedbacks through ACTS and VT both could produce a significant improvement beyond the 0.001 levels. Also, the difference between Mean Feedback Effect scores of VT (12.83) and FIACS (7.72), and ACTS (11.58) and FIACS (7.72) both (vide Table 4.68), are statistically significant at 1% and 5% levels respectively.
### Table 5.5

**Levels of Significance for 'Overall Teaching Performance'**

For the Three Kinds of Feedback

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Item</th>
<th>Level of Significance (For Feedback through)</th>
<th>Between Feedback Means (FIACS, ACTS and VT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>FIACS</td>
<td>ACTS</td>
</tr>
<tr>
<td>1.</td>
<td>Overall Teaching Performance</td>
<td>0.01</td>
<td>0.001</td>
</tr>
</tbody>
</table>

N.S. = Not Significant
The above results seem to suggest that the method of Feedback through VT as outlined in Chapter III is the most effective kind of treatment for improving the overall Teaching performance of technical teachers and followed by Feedbacks through ACTS and FIACS in the order given. This finding is further supported by the fact that while the obtained t-value was 5.399 in the case of Feedback through VT (Table 4.27), it was only 4.353 in the case of Feedback through ACTS (Table 4.26) and very much lower in the case of Feedback through FIACS (vide, Table 4.25). The above finding on the superiority of Feedback through VT in improving the Overall Teaching performance might probably be due to the effectiveness of both Peergroup Feedback (Tuckman & Oliver, 1968; Morse & Davis, 1970) and Videotape replay followed by observer comments. There is also sufficient evidence to support the above finding in Acheson (1964) and Olivero (1964) who had observed that a conference with Videotape feedback, is significantly more effective in modifying a teacher's behaviour than a conference without it (of course, in the intended direction). There is also adequate support in the reactions expressed by the technical teachers after the training programme. Table 5.6, shows that the Mean rating scores for the general effectiveness in the case of FIACS, ACTS and VT are 6.78, 7.39 and 8.11 respectively and that the difference between Mean rating scores were found to be significant at 0.10 level (FIACS & ACTS), 0.10 level (ACTS & VT), and 0.001 level (VT & FIACS) respectively.
### TABLE - 5.6

Mean Rating Scores of the Reactions expressed by all the 36 Ss for various items and levels of significance for difference between means

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Item</th>
<th>Preference</th>
<th>Effectiveness as felt by Ss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Skill of Questioning</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Preference</td>
<td>6.94</td>
<td>7.64</td>
</tr>
<tr>
<td></td>
<td>Effectiveness as felt by Ss</td>
<td>7.11</td>
<td>7.47</td>
</tr>
<tr>
<td>2.</td>
<td>Skill of Dealing with Answers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Preference</td>
<td>7.08</td>
<td>7.69</td>
</tr>
<tr>
<td></td>
<td>Effectiveness as felt by Ss</td>
<td>7.06</td>
<td>7.58</td>
</tr>
<tr>
<td>3.</td>
<td>Skill of Reinforcement</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Preference</td>
<td>7.08</td>
<td>7.69</td>
</tr>
<tr>
<td></td>
<td>Effectiveness as felt by Ss</td>
<td>7.19</td>
<td>7.56</td>
</tr>
<tr>
<td>4.</td>
<td>Skill of Stimulus Variation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Preference</td>
<td>6.06</td>
<td>6.39</td>
</tr>
<tr>
<td></td>
<td>Effectiveness as felt by Ss</td>
<td>6.19</td>
<td>6.64</td>
</tr>
<tr>
<td>5.</td>
<td>General Effectiveness</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6.78</td>
<td>7.39</td>
</tr>
<tr>
<td>6.</td>
<td>How far the training in teaching skills helpful in Polytechnic teaching.</td>
<td>7.06</td>
<td>7.56</td>
</tr>
</tbody>
</table>

**Note:**

- N.S. = Not Significant
- Maximum possible Rating score = 9
The above results also support the superiority of the Feedback through VT for its effectiveness over both Feedbacks through ACTS (the second) and FIACS (the third, in the order of effectiveness).

It has been found that Feedback through FIACS produces significant improvements in the items of 'Appropriateness of context of questions', 'Clarity of questions', 'Technique of putting questions', 'Purpose of questions', and the 'Skill of Questioning', whereas Feedback through ACTS and VT both have been found to produce significant improvements in all the above items and in addition 'Precision of questions', 'Nature of questions', and 'Variety of questions'. Also that none of these three kinds of Feedbacks produce a significant improvement in the number of questions asked in a 10-minute microlesson. It has also been found that Feedback through ACTS is superior to both the other kinds of Feedbacks, viz., through VT and through FIACS (the least effective kind of Feedback) for developing the various aspects of the skill of Questioning, although no significant difference between Feedback Means for the three kinds of treatments was obtained. The results given in Table 5.6 also supports the above finding because the Mean Rating scores both for their preference and the effectiveness as felt by them were found to be the highest for Feedback through ACTS (7.64 and 7.47 respectively).
and feedback through FIACS (6.94 and 7.11 respectively) and that the difference between Mean rating scores for their preference to Feedback through ACTS over FIACS was found to be statistically significant at 0.10 level.

It has been found that although all the three kinds of Feedbacks produce significant improvements in the technical teachers in their improvement of the skill of Dealing with Answers, Feedbacks through ACTS and FIACS were found to be more effective than Feedback through VT as can be seen from the levels of significance of the obtained values. But no significant difference between Feedback Means for the three kinds of treatments was obtained and it is quite supporting to note that none of the differences between Means, viz., FIACS and ACTS, ACTS and VT, and VT and FIACS, are statistically significant, although the Ss have rated Feedback through ACTS, higher for both 'preference' and 'Effectiveness as felt by them' (Mean rating scores 7.69 and 7.58) than Feedbacks through VT (Mean rating scores being 7.56 and 7.39 respectively) and FIACS (Mean rating scores being 7.08 and 7.06 respectively). Although the Ss have rated Feedback through FIACS for both their preference and effectiveness as felt by them to be the lowest, in fact this kind of Feedback has produced higher significant t-value (4.794) than in the case of the other two kinds of feedbacks. However, the high Mean ratings given by the Ss for Feedback through ACTS for both their preference
and effectiveness as felt by them agrees with the highly significant improvement produced by this kind of Feedback on the skill of 'Dealing with Answers'.

It has been found that Feedback though FIACS produces significant improvements in the items of 'Positive verbal reinforcement', 'Explanation' and 'Elaboration' of Student Answer/Initiatory talk, 'Variety in positive verbal reinforcement', and the overall 'skill of Reinforcement', whereas Feedback through ACTS produces significant improvements in 'Positive non-verbal reinforcement', 'Repetition', 'Explanation', and 'Elaboration of Student Answer/Initiatory talk', and the overall 'skill of Reinforcement'. Feedback through VT has been found to produce significant improvements in all the items mentioned under both the Feedbacks through FIACS and ACTS except 'Explanation' of Student Answer/Initiatory talk, and none of the Feedbacks was found to produce any significant improvement for the item 'Criticism of student Answer/Initiatory talk'. But, for none of the items under the skill of reinforcement, was there any significant difference between Means for the three kinds of Feedback treatments.

Although the Ss have rated Feedback through ACTS again higher for their 'preference' and the 'Effectiveness as felt by them' (Mean rating scores being 7.69 and 7.56 respectively) than either Feedback through VT (Mean rating scores being 7.58 and 7.33 respectively) or Feedback through FIACS (Mean rating scores being 7.08 and 7.19 respectively), no significant differences between Means, that is between either FIACS and
ACTS, or ACTS and VT, or VT and FIACS, was obtained and this supports the finding that none of the three kinds of feedbacks can be absolutely said to be superior to the rest of them, although each kind of feedback may be slightly more effective than others for developing certain aspects of the skill of Reinforcement.

It has been found that Feedback through VT produces highly significant improvements in all the aspects of Stimulus Variation, both verbal and non-verbal behaviours, viz., 'Catching the Attention of students', 'Student Participation', 'Pauses', 'Teacher position', 'Teacher Movement', 'Teacher Gestures', and the whole skill of 'Stimulus Variation', where as both the other kinds of Feedbacks, viz., through ACTS and FIACS, were found to produce significant improvements in only three of the items, 'Catching the Attention', 'Pauses', and the 'skill of Stimulus Variation'. Also significant differences between Feedback means for the three kinds of feedback treatments for all the items under the skill of Stimulus variation were obtained except for 'Student Participation', and 'Pauses'.

For developing the skill of improving student participation, only the Feedback through VT was found to be significantly effective, and for improving the skill of 'Pauses', all the three kinds of feedbacks were found to be equally and highly effective (all being significant
at the 0.001 levels) but Feedback through VT seems to be better ($t = 5.039$ vide Table 4.24) than Feedbacks through ACTS ($t = 4.149$ vide Table 4.22) and FIACS ($t = 3.693$ vide Table 4.20). For improving the skills of 'Catching the Attention of students', again Feedback through VT is superior because of the significant difference (0.10 level) between Feedback Means for the three kinds of treatments and also because of the highest $t$-value obtained (4.303, vide Table 4.24) for this kind of Feedback, compared with the other two kinds of Feedbacks.

Although Feedback through ACTS seems to be better than Feedback through FIACS because of the slightly higher $t$-values, both are not effective, where as Feedback through VT is the only effective kind of Feedback treatment for Producing significant improvements in the non-verbal behavioural aspects of 'Teacher Position', 'Teacher Movement', and 'Teacher Gestures', under the skill of 'Stimulus variation'. In fact the method of Feedback through VT as outlined in Chapter III has been found to be the most effective kind of Feedback for producing significant improvements in the whole skill of 'Stimulus variation', and this finding is also supported by the reactions expressed by the technical teachers who underwent the training programme. This is evidenced by not only the high Mean ratings given by them for the Feedback through VT expressing their 'preference' and the 'effectiveness as
felt by them' (namely 7.64 and 7.33 respectively) against both the other Feedbacks through ACTS (namely 6.39 and 6.64 respectively) and FIACS (namely 6.06 and 6.19 respectively), but also because of the significant differences between Mean ratings (VT and FIACS at 0.01 level, and VT and ACTS again at 0.01 level for 'preference', and VT and FIACS at 0.05 level for 'the effectiveness as felt by them') obtained.

The Ss after undergoing the training programme have rated Feedback through VT as superior by giving the maximum Mean Rating of 7.69 (Table 5.6) compared with the other two Feedbacks through ACTS and FIACS by giving lower Mean ratings of 7.56 and 7.06 respectively (Table 5.6) for the item 'How far the training in teaching skills helpful in their Polytechnic teaching', but this has no supporting evidence as none of the differences between Mean ratings (FIACS and ACTS, ACTS and VT, and VT and FIACS) was found to be statistically significant. It may mean that all the three kinds of Feedbacks in one way or other contributes for improvement of certain aspects of Teaching skills which will help them in their real Polytechnic teaching, probably because of the presence of supervisory Feedback (Salomon & McDonald, 1969; Doty, 1970; Morse, Kysilka and Davis, 1970; Young, 1970; and McIntyre, 1971) in all the three kinds of treatments.
As it has been established that a significant difference exists between the three kinds of Feedbacks for the 'Clarity' and 'Nature' of questions and the 'Technique' of putting questions (all under the skill of questioning), Positive 'verbal' and 'non-verbal' reinforcements (under the skill of reinforcement), 'Catching the Attention of Students', 'Teacher Position', 'Teacher Movement', and 'Teacher Gestures' (all under the skill of 'Stimulus variation'), the overall skill of 'Stimulus Variation', and even the 'Overall Teaching performance', the null hypothesis that 'there is no significant difference between the three kinds of Feedback (FIACS, ACTS and VT) in modifying technical teacher behaviour in microteaching sessions' stands disproved and rejected in favour of the positive finding. Earlier all the null hypotheses, 'Feedbacks through FIACS, ACTS and VT have no effect in modifying teacher behaviour in microteaching sessions' have been rejected in favour of the positive ones.

One of the incidental findings in this investigation is that while the Ss improved their teaching skills through the three different Microteaching cycles under different feedback treatments, each of the Ss also simultaneously improved his overall teaching performance in class-room situations as is evident from Fig.5.1. It also supports an earlier finding by the same author and there is adequate supporting evidence in Orme (1966) and Allen et al. (1969).
OVERALL TEACHING PERFORMANCE OF SUBJECTS

**FIG. 5.1**

OVERALL TEACHING PERFORMANCE OF SUBJECTS

Initial performance: levels of Ss before the first MT cycle

Performance levels of Ss after first MT cycle

Performance levels of Ss after second MT cycle

Performance levels of Ss after third MT cycle

Initial performance levels of Ss (before the first MT cycle)