DISCUSSION OF RESULTS

An analysis of the data given in Chapter IV, V, and VI would be of no consequence unless the outcome of the analysis is linked with the hypotheses upon which the study is based. The task of the present chapter, therefore, is to endeavour to reach conclusions that are fully supported by the data and which would be useful to several educational endeavours and future research studies.

For convenience, and to develop a discussion of the results systematically, the chapter has been divided into the following sections:

Section I Improvement in general teaching competence after training through the microteaching technique.

Section II Discussion of results during the process of training through the microteaching technique.

Section III Improvement in general teaching competence after training in
Section I  IMPROVEMENT IN GENERAL TEACHING COMPETENCE AFTER TRAINING THROUGH THE MICROTEACHING TECHNIQUE

The first hypotheses under investigation was that the gain in general teaching competence would be significant at the levels before and after training in micro-skills, i.e. the general teaching competence would improve as a result of the training in micro-skills.

In order to study the effect, if any, of the training in micro-skills on the general teaching competence of the trainees, the scores of all the 90 trainees were obtained on the BGTC Scale at the respective stages of before and after training in micro-skills. The t-value of the difference in the performance of trainees between the Pre-Test and the Post-Test(I) stages was noted to be 5.08. This t-value was found to be significant at the 0.01 level. On the basis of this, the results given in Chapter VI clearly show that there
exists a significant difference between the mean scores at the Pre-Test stage and the Post-Stage(I) stage, i.e. after the completion of training in micro-skills through the microteaching technique. This confirms our first part of the first hypothesis that there is a significant improvement in general teaching competence due to training in micro-skills through the microteaching technique.

There are research evidences in favour of the effectiveness of training through microteach technique. Microteaching was found to be effective in changing the teacher behaviours in the classroom by Berliner (1969), Borg et al. (1970), Goodkind (1968), Kallanbach (1967), Young and Young (1969), and Wragg (1971). Also in India, Chodasama (1971), Bhattacharya (1974), Joshi (1975), Lalita (1975), and Passi (1975), found that microteaching was an effective technique and rather more effective than the traditional technique in developing the teaching competence. Kallanbach and Gall (1969) found, on the contrary, that the use of microteaching in pre-service teacher training was not more effective as compared to the conventional approach as regards teacher effectiveness measured in terms of ratings. But they found it to be more economical technique in terms of time and money. The findings of the study by Allen and Ryan (1969) supported the above finding. The study revealed that a particular level of competence was acquired by student teachers...
trained through microteaching in one-fifth of the time required by student teachers trained through conventional approach.

The data, when subjected to the Analysis of Variance to note the impact of the variables of the subject area and sex of the trainee, revealed that the F-ratio for the sex variable and for the interaction of subject area and sex was not significant. This showed that the sex of the trainees had no impact on the improvement in general teaching competence as a result of the training in micro-skills. For the subject area variable the F-ratio was found to be significant, showing that general teaching competence varied with the trainee's choice of the subject area. When the data were subjected to further analysis in terms of t-ratios, the results showed that the trainees who opted for the subject area of the physical sciences showed a significantly higher improvement in general teaching competence than their counterparts opting for the social sciences or languages. This confirms our fifth hypothesis, in this section, that trainee in the physical sciences would show a higher gain compared to the trainees in the social sciences or languages. The sixth hypothesis, that male trainees in the physical sciences would perform better than females and that female trainees in languages would perform better than their female counterparts was disproved at this level because no significant sex differences were found at this stage. The
Possible reasons for the higher improvement in the case of the trainees who had a background in the physical sciences could be the following:

(i) In India, with the start of modern technological developments in the early 1950s, physical sciences subjects have been the 'preferred subjects'. Pupils with high achievement levels opt for these subjects and parents with high expectations prefer to have their children study these subjects. But for a few exceptions, the general trend during the past 30 years in the country has been that pupils with high achievements have been opting for the subject areas of the physical sciences with the motivations and expectations of going in for the 'engineering' or 'medical' professions.

(ii) The nature of the subject may have built-in structures which influence and/or lead to higher achievements by the trainees opting for the subject area of the physical sciences. The built-in structures within this specific subject area could include orientation in handling the transmission of received knowledge, which may be more specific and objective in the case of the physical sciences and more general and subjective in the case of the social sciences or
languages. The theories in these different subject areas may also differ so as to impart different types of orientation, e.g. there may be a more analytical approach in the physical sciences and a wholistic approach in the social sciences etc.

(iii) Experimentation being possible in the physical sciences and demonstration by models being easier in such subjects may also improve the efficiency of trainees in the physical sciences. This advantage is not easily available to trainees in the social sciences or languages.

The findings of MacLeod (1977) support our results that the humanities group of trainees had lower scores on the criterion measure of certain specified teaching skills compared with those of the ones in the sciences and mathematics; but he disproves the results by showing that trainees in the humanities scored less than even languages trainees. Differences across subject areas were also noted by Johnstone (1977), where he argues that not all students need same 'treatment'. If their strengths and weaknesses could be noted early enough, then it might be possible to use microteaching in a 'remedial' sense. Badami and Badami (1974) also showed that arts and science groups expressed favourable attitudes, and the commerce group was found to have, more or less, neutral attitude towards education.
Section II DISCUSSION OF RESULTS DURING THE PROCESS OF TRAINING THROUGH THE MICRO-TEACHING TECHNIQUE

While imparting training to the student teachers in all the 12 skills selected for the study, taking one skill at a time, the performances of the trainees were observed at the $S_1T$ stage and at the $S_2R$ stage. Both the quantitative as well as qualitative schedules were administered at these two stages.

Our second hypothesis states that there would be a significant quantitative as well as qualitative gain from the $S_1T$ stage to the $S_2R$ stage during training in micro-skills through the microteaching technique. The analysis of results given in Chapter IV show that for all the 10 skills where both quantitative and qualitative assessments were made there was a significant improvement in the use of a particular skill. These 10 skills were the Skill of Introducing a Lesson, the Skill of Fluency in Questioning, the Skill of Probing Questioning, the Skill of Reinforcement, the Skill of Explaining, the Skill of Stimulus Variation, the Skill of Recognising Attending Behaviour, the Skill of Blackboard Use, the Skill of Silence and Nonverbal Cues and the Skill of Achieving Closure. Only qualitative assessment was made in the case of the Skill of Illustration with Examples, and the Skill of Pupil Participation.
Here also the results show that there was a significant qualitative improvement from the $S_1T$ stage to the $S_2R$ stage for both these skills.

The results of the studies conducted by Orme (1966), Bush (1968), Goodkind (1968), Allen and others (1969), Claus (1969), Bell (1970), Borg and others (1970), Chudasma (1971), Wragg (1971), Marker (1972), Passi and Shah (1974), Abraham (1974), Bhattacharya (1974), Passi (1975), NCERT (1975-76), Passi (1976), Joshi (1976), Vaze (1976) and Lalita (1976), have been found to support the contention that the microteaching technique tends to help teacher trainees achieve mastery over the various skills selected for the study.

Passi and Shah (1974) found that microteaching was effective in developing the skills of questioning, reinforcement, silence and nonverbal cues, and illustration and use of examples. Marker (1972) found that microteaching was better technique in the development of certain specific teaching skills. Joshi (1974) found that microteaching was effective in developing the skills of reinforcement, and silence and nonverbal cues. Abraham (1974) found that it was effective in developing the skills of fluency in questioning and probing questioning. Bhattacharya (1974), while experimenting this technique with polytechnic teachers, found that microteaching was more effective in development of indirect teacher behaviour. Thresiamma (1975) studied the effectiveness
of feedback in the development of the skill of recognising attending behaviour. Joshi (1975), Lalita (1975) and Passi (1975) showed the development of various skills through microteaching technique, namely, skill of writing instructional objectives, introducing a lesson, fluency in questioning, probing questioning, explaining, illustrating with examples, stimulus variation, silence and nonverbal cues, reinforcement, increasing pupil participation, using blackboard, achieving closure and recognising attending behaviour.

The data, when further analysed in Chapter IV, revealed that in the case of the Skill of Fluency in Questioning, the Skill of Probing Questioning, the Skill of Stimulus Variation, the Skill of Recognising Attending Behaviour, the Skill of Silence and Nonverbal cues and the Skill of Achieving Closure, there was no difference in quantitative gain across subject areas. But for the Skill of Explaining, the trainees who opted for the physical sciences performed better than the trainees who took up the social sciences or for languages. For the Skill of Introducing Lesson, the trainees in the physical sciences performed quantitatively better than trainees in languages, and for the skill of Reinforcement and the Skill of Blackboard Use, the trainees in the physical sciences performed better compared to those in the social sciences. It could
be because of the nature of the components of the skill on which the quantitative assessment was made that the trainees in the physical sciences performed better. For example, for the components like explaining links and questions to test pupil's understanding etc., in the skill of explaining, the quantitative improvement was observed to be more in the case of trainees in the physical sciences because during the process of proceeding from the $S_1T$ stage to $S_2R$ stage, more extensive feedback could be given to increase explaining links in the physical sciences as compared to that in the social sciences or languages. So, to conclude this point, it can be argued that the quantitative difference in gain across subject areas was significant because of both, the nature of the components of the skill on which the quantitative assessment was made, and the inbuilt structures of the subject areas, as has been explained earlier in section I of this chapter.

The quantitative analysis showed that our fifth hypothesis that gain would be more for the trainees in the physical sciences compared to that in the social sciences or languages trainees was retained in the case of the skill of explaining, and was partially retained in the case of the skill of introducing a lesson and skill of Reinforcement. For all other skills taken up for quantitative analysis, the hypothesis was rejected.

For the skills of fluency in Questioning, and Achieving closure the overall quantitative performance of the male trainees was significantly better than their female counterparts, while for the skill of blackboard use the quantitative gain for female
trainees was significantly better than that of the males. For other skills the sex variable was not significant in the quantitative analysis.

On the other hand, the qualitative analysis revealed that the gain from the $S_1T$ stage to the $S_2R$ stage during the progress of microteaching cycles was significantly higher in the case of the trainees who opted for the physical sciences than the trainees who took up for the social sciences or languages for all the skills selected for the study. The qualitative assessment reflects the extent to which the trainee exhibited the use of a particular skill. The analysis revealed that all the pupils, after getting feedback, while proceeding from the $S_1T$ stage to the $S_2R$ stage gained qualitatively and the trainees in the physical sciences gained qualitatively significantly more than their counterparts in the social sciences or languages. This confirms our fifth hypothesis that the trainees in the physical sciences would gain more than those in the social sciences and languages at this level of the experiment.

It was interesting to note that in the case of the skill of probing questioning, the skill of fluency in questioning, the skill of stimulus variation, the skill of recognising attending behaviour, the skill of silence and nonverbal cues there was no significant difference across subject areas on the quantitative assessment and a highly significant difference across subject areas was observed on the qualitative assessor
where trainees in the physical sciences subject area gained more than their counterparts in the social sciences and languages. The explanation for this result may be the fact that in the case of the quantitative assessment it was simply marking tallies and these tallies increased only when more occasions were created in a particular component of a skill. But the qualitative assessment was meant to ascertain the extent to which the trainee exhibited the skill. The assessment was done on a rating scale, and after getting feedback in the microteaching cycles there was every likelihood that the trainee would gain much qualitatively. As explained earlier in Section I, because of the nature of the inbuilt structure of the subject areas and the nature of the competents of the skill under use, the trainees in physical sciences might have performed qualitatively better, showing significant difference in the qualitative gain, than the trainees in the social sciences or in languages.

The results discussed above show that the teacher trainees in the social sciences and languages had lower scores on the criterion measure of qualitative assessment for almost all the teaching skills taken for the study, as compared to those in the physical sciences. One interpretation offered (a research study by McLeod et al. 1977),
for the relatively poorer showing of the humanities student teachers in use of the skills is that the subject ideologies of English and History, might be a related factor. Such an explanation, however, fails to take sufficiently into account the effects of the interaction between the subject ideology and the ideology of micro-teaching, as put by Gilmore (1977). Gilmore further explained that when the humanities student entered a microteaching programme, he entered a situation of conflicting educational ideologies with the result that his performance and the effectiveness of the programme were both vitiated. Gilmore referred that if in a particular training situation, where almost 60 per cent of the trainees who belonged to humanities group were in a state of conflict, then it was irresponsible not to examine the sources of the conflict in order to contain or resolve the conflict. Gilmore explained it to the extent that the conflict would be more among English trainees than any other group, because of two main sources -- the frame of reference which the trainees brought to elicit meaning from the context of microteaching; and the concept of teaching skills as exemplified in microteaching.

It is important to mention here that according to Adams and Pearce's (1974) 'competence and growth model', the central task of the language teacher is to foster the personal growth of the pupils and to increase their capacity to use a language for all those purposes which their lives make necessary. This model comes in conflict with the 'behaviour modification' model
of microteaching (Gilmore, 1977). He explained that unlike the trainees of modern languages whose lesson strategies were mainly pragmatic or that of science student who often employed heuristic procedures in teaching, the English teacher trainee may not precisely determine pupil outcome to the same extent as his peers operating in other subject areas because he perceives his role as that of providing 'enabling' conditions for the pupils to construe meanings from literary artefacts. It is not being suggested here that the pre-service language teacher finds it difficult to justify microteaching as a relevant training procedure on empirical, rational or pragmatic grounds. In contrast to 'the master teacher' approach to teacher training with its assumption that the trainee is able to grasp the complexities of the on going classroom events simply by observation, imitation, and practice in field settings etc., in the most recent microteaching approach the emphasis is on systematic observation and analysis of teaching behaviour.

The results further show that for most of the skills under study the sex variable was not significant in the quantitative or qualitative improvement of the trainee. But it was observed that for the Skill of Fluency in Questioning and the Skill of Achieving Closure the overall performance on the quantitative schedule for the male trainees was significantly better than the female trainees, while
for the skill of blackboard use the quantitative gain of the female trainees was significantly more than that of their male counterparts.

It was further interesting to note that out of the total trainees who opted for the subject area of the physical sciences, the male trainees performed significantly better, mostly qualitatively, and out of the trainees who chose the subject area of languages and sometimes the social sciences, the qualitative performance of the female trainees was significantly better than that of their male counterparts during imparting training in the skill of introducing a lesson, the skill of explaining, the skill of stimulus variation and the skill of silence and nonverbal cues. This shows that for these four skills, our sixth hypothesis that male trainees in the physical sciences and female trainees in languages would perform better than their female and male counterparts in the respective subject area categories is confirmed. But this hypothesis stands rejected for other skills taken for the study. Santhanan (1972); Quraishi (1973); Lulla (1975) have reported significant differences in the classroom behaviour patterns between male and female teachers.

Section III IMPROVEMENT IN GENERAL TEACHING COMPETENCE AFTER TRAINING IN INTEGRATED SKILLS

The trainees, after having been given training in
micro-skills were imparted training in meso-teaching by integrating the skills, taking the bi-clustered($I_1$), tetra-clustered($I_2$) and hexa-clustered($I_3$) integration strategies. To get the final scores after giving training in the three strategies of integration, the BGTC Scale was again administered on all the trainees. The gain in scores from the stages before and after giving training in meso-teaching was computed to study the effects, if any, of the training in meso-teaching. The t-value of the difference in the performance of all the trainees between the Post-Test I stage and the Post Test II stage was found out to be 4.28 which was significant at the 0.01 level. This confirms the second part of our first hypothesis that there would be a further significant gain in general teaching competence as a result of the training in meso-teaching.

The data, when subjected to the Analysis of Variance to note the impact of the variables of subject area, integration strategy and sex differences in the trainees, revealed that the F-ratios for the main variables of Subject Area and Integration Strategy were significant, while for sex variables the F-ratio was not significant. When subjected to further analysis, the t-values revealed that the trainees in the physical sciences gained significantly more than the trainees in the social sciences and languages, which confirms our fifth
hypothesis regarding differences across subject areas at this level.

The tetra-clustered and hexa-clustered integration strategies was found to be the more effective one in improving general teaching competence. The impact of these strategies was significantly better than that of the bi-clustered strategy. No significant differences were observed between the tetra-clustered and hexa-clustered strategies. These results partially confirm our fourth hypothesis that the gain in general teaching competence would be higher for the groups trained with \( I_2 \) than those trained with \( I_1 \). The other part of the hypothesis that the groups trained with \( I_3 \) would gain higher than those trained through \( I_2 \) stands rejected.

It was further observed that for the trainees in the physical sciences the tetra-clustered and hexa-clustered strategies were more effective, while for the trainees in languages, all the three strategies were equally effective in improving the general teaching competence of the trainees. For the trainees in the social sciences, the tetra-clustered strategy was more effective than the bi-clustered and hexa-clustered strategies.

Further, within the bi-clustered strategy of integration there were no significant differences between any two levels of subject area, while within the tetra-clustered and hexa-clustered
strategies the trainees in the physical sciences improved their general teaching competence more than their counterparts in the social sciences and languages.

So, to conclude, it was observed that there was a significant improvement in the general teaching competence as a result of the training in mesoteaching and there were no significant differences in this improvement between male and female trainees. For the trainees who were given training in tetra-clustered and hexa-clustered integration strategies, trainees in the physical sciences subject area gained more than those in the social sciences and languages. For the trainees in the social sciences the tetra-clustered strategy was more effective, while for those in languages all the strategies were equally effective, and for those in physical sciences, tetra-clustered and hexa-clustered strategies were more effective.

This shows that the integration strategy is dependent upon the nature of the subject area and also the content matter. It also leads us to believe that the selection of a particular strategy and training in it is not off-hand, without caring for the nature of the skills and the content matter, but a conscious effort for selecting would have to be made in accordance with these requirements.
Section IV DISCUSSION OF RESULTS DURING PROCESS OF TRAINING IN MESO-TEACHING

While imparting training in integrated skills, the qualitative performance of all the trainees was noted at the $S_2R$ stage of the meso-cycle, in the three integration strategies -- bi-tetra and hexa-clustered -- on the schedule for integrated skills. An analysis of the scores on this schedule was made with the help of the Analysis of Variance technique to note the impact of subject area, sex differences, and the various combinations of skills(sets) adapted within a particular strategy of integration.

The data reveal that for the $I_1$ (bi-clustered) strategy of integration the F-ratios for subject area and sex differences were not significant. This showed that the subject area and sex of the trainee had no impact on the bi-clustered strategy of integration and it rejects our fifth and sixth hypothesis at this level. For the set, the F-ratios was found to be significant, showing that the effective exhibitions of integrated skills, varied with the different combinations of the skills, when two skills are integrated at a time. When subject to further analysis, t-values showed that while the trainees were integrating the skills in set B and set C, their scores were significantly higher than their scores in set A; and the scores on set A were significantly higher than their scores in set C and
set D; and further, the scores in sec C and set D were significantly higher than their scores in set F. This shows that in a bi-clustered strategy of integration, the most effective integration was exhibited for the set which included the skill of Probing Questioning and the Skill of Reinforcement, and the set in which the Skill of Blackboard Use and the Skill of Increasing Pupil Participation were integrated. The second best set was obtained by integrating the Skill of Introducing a Lesson and the Skill of Fluency in Questioning. The set integrating the Skill of Explaining and the Skill of Stimulus Variation, and the set containing the Skill of Illustration with Examples and the Skill of Recognizing Attending Behaviour occupied the third position. The least effective integration was exhibited for the set which included the Skill of Silence and Nonverbal Cues and the Skill of Achieving Closure.

The results partially confirm our third hypothesis that there would be no difference in Qualitative scores across different sets within a specific strategy of integration. The hypothesis is confirmed for the set B and set E, and for the set C and set D where no significant difference between the sets was observed. But for all other sets, significant differences across sets were noted, and it rejected our third hypothesis for $I_1$ strategy of integration.
It is important to mention here that while combining the skills in twos much care would have to be taken in determining the similarity between the various components of the skills under the process of combination to get a proper fusion of the components.

For the $I_2$ (tetra-clustered) strategy of integration, the F-ratios for subject area, sex differences and sets were not significant, but the F-ratio for the interaction of subject area and set was found to be significant at the 0.05 level. When subjected to further analysis, the t-values showed that while integrating the skills in fours the trainees in the physical sciences were able to integrate the skills in Set G and Set I significantly better than in Set H, while the trainees in the social sciences were able to integrate the skills in Set G and Set H significantly more effectively than in Set I. In the case of the trainees in languages the integration in all the sets was equally good. This means that the trainees in all subject areas could integrate the skills in Set G (the Skill of Introducing a Lesson, Fluency in Questioning, Probing Questioning and Reinforcement) equally well but the trainees in the physical sciences integrated in the skills in Set I (the Skill of Blackboard Use, Increasing Pupil Participation, Silence and Nonverbal Cues and Achieving Closure) better than those in Set H (the Skills of Explaining, Stimulus Variation, Illustrated with Examples and Recognising Attending Behaviour), while the trainees in the social sciences
exhibited a better performance in Set H than in Set I. The analysis gives us an insight into the fact that we would have to choose with care the skills to be integrated, in accordance with the choice of the subject area by the trainee, for a particular strategy of integration. At this stage, the analysis confirms our fifth hypothesis that there would be a significant difference across subject areas; and the analysis rejects our third hypothesis that there would be no significant difference across sets.

For the I₃(hexa-clustered) strategy of integration, the F-ratios for subject area, sex differences and sets, and also for all the interactions were not significant. This shows that when the skills were combined in sixes there was no difference in performance across any two levels of subject area, nor between male and female trainees. The various combinations of skills also had no impact on the integration of skills in the case of the hexa-clustered strategy. The analysis at this stage confirms our third hypothesis that there would be no significant difference across sets; and it rejects our fifth and sixth hypothesis that there would be significant differences between male and female trainees in the physical sciences and languages subject areas.

To conclude here, the analysis of different strategies of integration revealed that in the case of the bi-clustered strategy of integration, the Skills of Probing Questioning and Reinforcement, and the Skills of Blackboard Use and Increasing
Pupil Participation were the most effective, the combination of the Skills of Introducing a Lesson and Fluency in Questioning was the next most effective while the other combinations were less effective. In the case of the tetra-clustered strategy the trainees in the physical sciences used the skills in Set G and Set I significantly better than in Set H while the trainees in the social sciences used more effectively the skills in Set G and Set H than Set I, and no difference across sets was observed for languages. In the case of hexa-clustered strategy of integration, there were no significant differences across subject areas, sex and sets.

Section V OVERALL IMPROVEMENT IN GENERAL TEACHING COMPETENCE

The third part of our first hypothesis under investigation was that the general teaching competence of the trainees would improve as a result of training in both microteaching and meso-teaching. In order to note the impact of overall training on the general teaching competence of the trainees, an analysis was made of the scores on the BRTC Scale at Pre-Test stage and Post-Test II stage, i.e. before any training and then after training both in microteaching and meso-teaching. The t-value of the difference at these two stages was noted to be 8.61, which is significant at the 0.01 level, indicating that there was a highly significant overall improvement in the general teaching competence of the trainees. The results at this stage confirms our first hypothesis.
The data, when subjected to the analysis of Variance to note the impact of the Variables of subject area, sex and strategy of integration, revealed that the F-ratio for sex differences was not significant, while it was so for subject area and strategy of integration. It was also significant for the 'subject area x integration strategy' interaction and the 'subject area x sex' interaction. When subjected to further analysis, the t-value showed that the trainees in the physical sciences gained qualitatively more in general teaching competence than their counterparts in the social sciences and languages confirming our fifth hypothesis at this stage. Further, the tetra-clustered and hexaclustered strategies of integration were found to be more effective in improving the general teaching competence than the bi-clustered strategy. Here, our fourth hypothesis is partially confirmed when we observe $I_2$ and $I_3$ strategy of the integration to be more effective than $I_1$ strategy of integration. But the hypothesis stands rejected when the analysis show that there is no significant difference between $I_2$ and $I_3$ strategies of integration.

The analysis further revealed that in the case of the trainees in the physical sciences the tetra-clustered and hexa-clustered strategies were more effective than the bi-clustered strategy; in the case of the social sciences, the tetra-clustered strategy was more effective than the bi-clustered and hexa-clustered strategies. In case of languages, all the strategies were almost equally effective.

It was further noted that within the bi-clustered strategy of integration, there was no difference in general
teaching competence across subject areas while within the tetra-clustered and hexa-clustered strategies, the trainees in the physical sciences gained more in overall general teaching competence than their counterparts in the social sciences and languages. Further, for the trainees who opted for languages, the female trainees gained more than their male counterparts. The overall gain in general teaching competence in both male and female trainees was observed to be significantly higher in the trainees with physical sciences background than those with social sciences and languages background.