Chapter 2

REVIEW OF RESEARCH

Introduction and Organisation of Chapter

In the preceding chapter the development of microteaching was highlighted from its beginnings at Stanford University. Out of the discussion of the historical development of microteaching and the review of the research literature related to the effectiveness of microteaching, evidence emerged that the findings of research into the effectiveness of microteaching have not been conclusive. In fact, microteaching was sometimes not seen to be more effective than some alternative training programmes (Batten, 1978).

In addition, but not unrelated to this lack of conclusive evidence into the effectiveness of microteaching, three issues all related to skill acquisition arose that warrant a more detailed investigation of the literature. The first issue concerns the possibility of "critical elements in the microteaching format" (Batten, 1978, p. 396). Several investigators (e.g., Wagner, 1973; MacLeod and McIntyre, 1977; Gliessman *et al.*, 1979a; Malley and Clift, 1980) have supported Batten's view that modelling and discrimination training may be the "critical elements". Malley and Clift (1980) also saw the possibility of a connection between these "elements" and the conflicting nature of the results relating to the effectiveness of microteaching when compared with other programmes. They suggested that

> One possible explanation for microteaching to be on balance equally as effective in changing behaviour as other training methods is then the inclusion of significant elements of modelling and forms of discrimination training in control group programmes. (p. 166)

The second issue relates to two conflicting beliefs held by a number of educators, namely, that reteach sessions do not serve to increase performances (e.g., Turney, 1970) and yet at the same time phrases such as

"practice makes perfect" abound in the literature (e.g., Hudgins, 1974; Trower, Bryant and Argyle, 1978). The final issue concerns the possible frameworks that are considered to underpin the process of skill acquisition. The previous chapter alluded to some of the early rationales for microteaching, namely, the "pragmatic" model of Allen and Clark (1967) and the behaviouristic model of McDonald (1973). Further models have been suggested in the literature. They included the social skills training model of Argyle (1970) which emphasised modelling and practice and a number of cognitive models which de-emphasised, to various extents, the role of practice.

This chapter is divided into three sections. The first considers the literature related to modelling, discrimination training, practice, and frameworks for microteaching. The second, Summary and Conclusions, brings together the major issues which have emerged from this review. The final section, Research Questions, Hypotheses and Themes, takes the major issues identified and expresses them initially in the form of research questions and, where appropriate, these questions are presented as specific hypotheses to be tested and themes to be investigated.

MODELLING

This section presents initially a theoretical rationale for the inclusion of modelling procedures in a microteaching programme. This is followed by a discussion of five aspects of modelling in sufficient detail to indicate and explain the established trends of the research effort.

Theoretical Rationale

Modelling, that is, learning by observation, has been a key aspect of teacher training programmes for a long time. Before microteaching it took the form of class visitations by groups of trainees who watched experienced teachers give "normal" lessons. As videotape and film materials became more available, filmed episodes became more popular as they had the advantage of being able to be examined and re-examined within

the training institution. It was a logical extension then that modelling would become part of the microteaching programme. Allen and Ryan (1969) credited the use of modelling to the work of McDonald and Bandura. Once again it seemed that a pragmatic decision was taken that modelling be used as a component of the programme because it "was thought that if the demonstration of a particular skill could be recorded on videotape and shown to a trainee prior to his practice..., his learning of the skill would be enhanced" (Allen and Ryan, 1969, p. 27).

The work of Bandura gave theoretical respectability to the use of modelling and was referred to by many writers when discussing aspects of modelling. Initially his work was mainly concerned with children's imitation of aggressive behaviours; later, however, it showed that complex social behaviours can be acquired almost entirely through imitation (Bandura and Walters, 1963) and that film models were as effective as live models (Bandura, Ross and Ross, 1963). Commenting on the development of Bandura's theory of social learning, Koran (1974) stated that it dates back to the work of Tarde (1903) who "discussed 'imitation' as an innate, instinctive, or constitutional process or propensity" (p. 205). This led to the work of Miller and Dollard (1941) and Mowrer (1960) whose contributions were also acknowledged by McDonald and Allen (1967). The underlying factor in both the works mentioned was the vital role played by motivation. This occurred either by direct reinforcement of the learner or indirectly by having the model's behaviour reinforced (i.e., by vicarious reinforcement of the learner).

Bandura and Walters (1963) and Bandura (1965) believed that these theories failed to explain the learning of modelled responses under two circumstances: when the learner did not perform the model's responses during the process of acquisition; and, when reinforcers were not given to either the model or the learner. The argument put forward was that the acquisition of imitative responses could best be explained in terms of the contiguity theory of observational learning by Sheffield (1961) and Bandura (1965). According to this conceptualisation, Bandura (1965) explained

> when an observer witnesses a model exhibit a sequence of responses the observer acquires, through contiguous association of sensory

> events, perceptual and symbolic responses possessing cue properties that are capable of eliciting, at some time after a demonstration, overt responses corresponding to those that had been modeled.
>
> (p. 590)

It is useful at this stage to clarify the meanings of the terms "imitation learning" and "observational learning". The first refers to producing basically "carbon copy" behaviours of those responses modelled; Koran (1974) suggested that this was an aspect emphasised in the early Stanford studies. The second refers to producing a number of responses that belong to or represent a class of desired behaviours.

Bandura (1977) has extended and refined his theory of social learning and he wrote that "virtually all learning phenomena resulting from direct experience occur on a vicarious basis by observing other people's behavior and its consequences for them" (p. 12). He also added that modelling considerably shortens the process of acquisition of behaviour. Two aspects stand out as features of his social learning theory, namely, the capacity of humans to use symbols both verbal and imagined, and the prominent role the theory assigns to self-regulatory capacities.

Bandura saw learning by observation occurring through the "informative function" which is governed by four component processes - attention, retention, motor reproduction and motivation (p. 23). In more detail, attentional processes refer to accurate perception of the key features of the modelled behaviour. The retention process refers to the aspect of remembering the modelled behaviour in some symbolic form. Bandura believed that "it is the advanced capacity for symbolization that enables humans to learn much of their behavior by observation" (p. 25). The motor reproduction process refers to the performance of the behavioural occurrences of what was previously retained in memory. The motivational processes refer to the more likely acquisition of the modelled behaviour if that behaviour is valued.

In summary, the main effects arising from the observation of a model include that the learner (i) may acquire new behaviours that previously were not contained in the learner's repertoire, (ii) may perform behaviours that had not been previously performed, and (iii) may strengthen or weaken existing responses already possessed by the learner.

Research Studies Related to Modelling

Research on microteaching shows that the use of modelling of specific skills facilitates the acquisition of those skills (e.g., McDonald and Allen, 1967; Koran, J.J., 1969; Koran, M.L., 1969; Koran, 1971; Goodwin, 1972). Much of the research effort involving the modelling component has been directed towards

a) the superiority of either positive or negative models;
b) the comparison of written (symbolic) models with film of videotape (perceptual) models;
c) the comparison of audio models with audio visual models;
d) the value in focusing on particular aspects of the model;
e) the preparation of materials.

a) Positive or negative models

Bandura and Walters (1963) made the point that models do not necessarily need to be positive. Use could be made of negative models which demonstrated some behaviour in which consequences were identified and the learner told not to repeat them. MacLeod (1981b) identified several problems related to the interpretation of results of studies involving negative models. For example, does a negative model imply "absence of the criterion behaviours, or few of the criterion behaviours, or inappropriate use of the criterion behaviours, or, perhaps, exemplification of the behaviours to be avoided" (p. 3)?

Perhaps because of this, the evidence available at present seems to support the use of positive models (Allen *et al.*, 1967; Koran *et al.*, 1972; Gilmore, 1977). Allen and his colleagues (1967), for example, used positive, positive and negative, and negative models; and although the

positive models were the most effective, the other models did aid skill acquisition.

b) Symbolic or perceptual models

The majority of articles on microteaching lean very strongly towards the use of perceptual (i.e., audio visual) models over symbolic (i.e., written) models despite the fact that not all studies involved in comparing different formats consistently indicated that perceptual models were superior. For example, several studies (Allen *et al.*, 1967; Berliner, 1969; Koran, 1971) showed no differences between symbolic and perceptual models. The last two studies also indicated that perhaps audio visual models were not necessary when oral skills such as questioning were involved. Koran (1971) elaborated on this point and suggested that when modelling a skill such as questioning, symbolic models might actually be of particular help to students who had initially low pre-test scores.

As a counter to these conclusions other studies (Orme, 1966; Koran M.L., 1969; Young, 1969) found that perceptual models were superior to symbolic models. A further study which identified the superiority of perceptual modelling was that by McDonald and Allen (1967). However, Brusling (1974) questioned whether the two modelling procedures were equivalent, as the written transcript did not reproduce the dialogue of the videotape. Several studies (e.g., Gall *et al.*, 1970; Acheson and Tucker, 1971; Galassi *et al.*, 1974) which replaced the perceptual model by a script found no significant differences between groups undertaking either technique.

In summary, whilst the success of one method of modelling is not clear, it seems that "If possible, a combination of both perceptual and symbolic models might be employed to ensure optimum learning" (Turney *et al.*, 1973, p. 12). However, if the choice is restricted, then perceptual models should be used if only for the added "motivational value" (Borg *et al.*, 1970, p. 41).

c) Audio or audio visual modelling

A similar picture emerges here as with perceptual and symbolic models, namely, that research shows little difference between the two modes but that practitioners prefer to use audio visual models over audio models. The number of studies that directly compared the use of the two modes is small. Turney and his associates (1973) noted that a study by Myrick (1969) found that, in counselling, audio models were more effective in developing statements of self-reference. He suggested the reason for this was that audio models provide less irrelevant or distracting information. Ward (1970) also supported the use of audio models in developing the skill of probing questioning.

Further problems in this area arise by the confounding of the work on modelling with studies concerned with different forms of feedback. However, several of the general results found may have particular relevance to modelling. Hiscox and Van Mondfrans (1972), when reviewing the literature on modes of feedback stated that "theoretically, audio tape may even have an advantage over video tape" (p. 3). They added later that with studies involving verbal behaviour a visual component is "extraneous and may distract from the pertinent information presented through the audio track" (p. 3). They also referred to the work of Travers (1970) and suggested that since television viewing is so common "the information presented might never go beyond a superficial processing. ...Audio tape, on the other hand, usually requires active attention" (pp. 3-4).

It seems possible that the effectiveness of perceptual, symbolic, or audio models depends largely on the skill being practised and the use to which the models are put. A plea by Ward (1970) that it "is possible that audiotape recorders are grossly underrated" can be balanced by comments by Bandura (1977) who supported those of Borg and his associates (1970), mentioned earlier, when he stated that "models presented in televised form are so effective in capturing attention that viewers learn much of what they see without requiring any special incentives to do so" (p. 25).

d) **Focusing on particular aspects of the model**

In general, models are rarely presented to the student without some form of cueing to focus the learner on the relevant aspects to be acquired. This can take the form of a "short beep" or "auditory cue" (Brusling, 1972) or some visual cue like a label (Turney *et al.*, 1973a) or even a critical incident approach (Bjerstedt, 1968) in which the perceptual model was stopped at certain points and the students asked to react to the situation presented. Also included in the cueing procedures could be detailed instructions of what to look for in the model, the use of rating or observation schedules by the students, or the use of questions to focus the students' attention on specific behaviours.

The overall evidence in general supports the use of cueing. This evidence suggests that cueing does assist in adding to the effectiveness of modelling procedures (Orme, 1966; McDonald and Allen, 1967; Claus, 1969).

e) **The preparation of materials**

The preparation of modelling materials was approached, initially, on two fronts in the U.S.A. The main impetus for this was the work of Smith (1969) when, in discussing the problem of achieving interpretive competencies which teachers could perceive and operable skills which teachers could implement, he identified the need for "protocol materials" and "training materials". He viewed the preparation of teachers as including two general components: a theoretical or conceptual component which required a need for protocol materials; and a methodological or skill component which required training materials. The success of such materials would be seen in the identification of instances of the concept discussed for protocol materials and an overt and observable demonstration of the skill for training materials.

Smith saw the concepts behind the formation of each type of material as being different. Because of this and the funding principles of the U.S. Office of Education, various institutions took on the task of preparing the different materials. Although Gliessman (1972) suggested

that there was little difference between the two approaches, he added, however, added "that in any teacher education program, the acquisition of both interpretive competencies and specific skills should be major emphases" (p. 2).

Kleucker (1974) confirmed that there was little difference between the outcomes in both concept formation and skill performance when using either type of material. Significant differences were noted when both types of materials were used together, but this could be accounted for by the increased time allocation needed which was double the time for the use of one set of materials.

Borg and Stone (1974), whilst admitting that protocol materials were not originally intended to change teaching behaviours, used them in the preparation phase in experiments involving the behavioural outcomes of their trainees.

Gliessman (1972) saw the development of protocol materials in two formats "(a.) film clips that as clearly and 'cleanly' as possible exemplify a given concept and (b.) somewhat longer films of complex behavioral events that are interpretable in terms of a set of such concepts" (p. 6). It is interesting that by 1974 approximately 140 protocol products had been developed as part of the Protocol Materials Project in several American universities and nine sets of training materials had been produced under the direction of the National Center for the Development of Training Materials at Indiana University (Cooper, 1975). In the period 1975-1979 interest in protocol materials continued to grow and "over 3000 institutions in the United States and in 18 other countries obtained protocol materials from the National Resource and Dissemination Center" (Orlosky, 1980, p. 276).

Australia also moved in the direction of modelling material preparation and in 1972 the Sydney Micro Skills programme was launched. Although avoiding titles such as "protocol materials" and "training materials", the project team reacted to a need identified in a survey of training institutions in Australia (Turney *et al.*, 1973). The project team

developed both audio visual materials and handbooks which were suitable for trainees and instructors. The project team stated that "The courses have the general purpose of developing in teachers a practical and penetrating understanding of a limited number of teaching skills.... More particularly, the courses aim at facilitating the acquisition of the skills through observation, practice and evaluation" (Turney *et al.*, 1975, pp. 1-2). It is unfortunate that the Sydney Micro Skills project team did not undertake systematic investigation of the effect or effectiveness of their product.

The American product did not suffer the same fate and the results of several studies in the mid 70s (Barnes, 1972; Borg, 1973; Kleucker, 1974; Gliessman and Pugh, 1976; Pugh and Gliessman, 1976) all identified the effectiveness of protocol materials when the criterion was identification of specified concepts in excerpts of classroom behaviour. Further, studies by Kleucker (1974), Borg and Stone (1974) and Gliessman and his associates (1979a) showed protocol materials may also bring about changes in teachers' behaviour.

These later studies are of particular interest. They highlight a refocusing of emphasis by several investigators. In the United States the most notable examples occurred in the writings of Gliessman (1972, 1981) and Gliessman and his co-workers (1976, 1978, 1979a,b) and referred to the increasing prominence played by what they referred to as 'concept learning'. A detailed discussion of this aspect is undertaken in the next section of this chapter.

The previous discussion of the five aspects of research effort highlights, to some extent, the size of the commitment by investigators to modelling in microteaching. Griffiths (1976) summarised this point by stating "Modelling is one of the most extensively researched components of microteaching procedure" (p. 25). However, as with so much of the research into microteaching, there are often conflicting results and much more work is required to clarify opposing positions. Despite the equivocal nature of some results, the value of modelling procedures in microteaching would seem to be beyond question. The use of edited video tape, audio tape and film

or written transcripts to highlight key aspects of a skill which could be reviewed and discussed would seem to be a logical conclusion to this point of view.

However, Jones (1979) noted several trends which suggested that this was not the case, at least in the United States. He stated that

> Frequently utilized modeling protocols included live demonstrations by 84.8 percent and videotapes or films of both positive and negative examples by 29.5 percent. Information about teaching skills was provided most often by written descriptions or by lecture/discussions. Audio-tapes of both positive and negative examples of teaching skills were frequently used by only 8 percent of institutions.
>
> (pp. 8-9)

Jones' concern with this situation can be seen in two of his five concluding recommendations which were directed at increased access and greater usage of modelling materials (pp. 14-15).

Griffiths in a summary statement on modelling made a number of generalisations from his review of the literature, namely,

1. For models to be effective in modifying teacher performance, the target behaviours need to be specifically defined and to be clearly exemplified in the modelling materials....
2. Opportunities for practice of the modelled behaviours may not be necessary for learning to take place,....
3. Written transcript models of verbal behaviours can be as effective as perceptual models but may not be as motivating....
4. The effectiveness of a symbolic model in the form of a skill description can be increased by the addition of a perceptual model....
5. Positive models seem generally most effective, but negative and mixed models can be effective given additional guidance....
6. There is no reason to assume that models have to be drawn from 'real' classroom teaching contexts in order to be effective....
7. There are no demonstrated effects of the sex, age, or prestige characteristics of the model teacher on the effectiveness of models....
8. The incorporation of a form of contiguous cueing in models tends to increase their effectiveness....

9 There is little direct empirical evidence but considerable support from writers, for some form of trainee activity during exposure to models....
10 Any modelling procedure is likely to be differentially effective within a group of trainees....
11 There is little empirical evidence to guide decisions about the length of model episodes or number of exposures required for optimum learning....

(pp. 26-29)

From this detailed summary by Griffiths and the preceding discussion, several features emerge. There is clear evidence that training programmes should include some modelling component in the microteaching format. Ideally modelling should allow for replaying of excerpts (if required) and salient features should be brought to the students' (or trainees') attention by cueing of some form.

Two further issues were raised by Griffiths in his points 2 and 9 above. The former concerned the questioning of the role of practice and this is considered later in this review. The latter concerned the possible value of "some form of trainee activity" (p. 29) associated with modelling. In particular, Griffiths went on to state that "Especially interesting in this context is the cognitive discrimination procedure" (p. 29).

A detailed consideration of the literature related to cognitive discrimination training in microteaching is considered below.

DISCRIMINATION TRAINING

This section begins by examining the definition of discrimination training. Following this a number of research articles, both directly and indirectly related to discrimination training, are reviewed in detail.

Defining Discrimination Training

Foster, Heys and Harvey (1973) in a review of the effectiveness of microteaching suggested that

> It may be possible,...that the results now achieved with a full microteaching sequence can be obtained by using only portion of the process.
>
> (p. 105)

This idea was developed by several writers (e.g., Wagner, 1973; MacLeod *et al.*, 1977; Batten, 1978) and the "portion of the process" that they believed to be significant was the discrimination training aspect.

There are some problems with different interpretations of the definition of the term "discrimination training". Wagner saw discrimination training as "using a model that demonstrates certain behaviors or by having a supervisor point out salient aspects of the trainee's performance. ...[and] cognitively learning to discriminate between appropriate and inappropriate behavior" (pp. 299-300). She saw discrimination training as attending to two aspects in the learning process, namely, "learning to attend to the relevant dimension and then learning to distinguish between different 'values' within this dimension" (p. 299).

MacLeod, Griffiths and McIntyre (1977, p. 142) challenged Wagner's study (1973) on the grounds that most programmes of microteaching do include a modelling component but not a discrimination training component. They saw this first aspect of the learning process (i.e., "learning to attend to the relevant dimension") as part of modelling and common to most microteaching programmes. Only the second aspect (i.e., "learning to distinguish between different 'values'") was referred to as discrimination training.

There is general support for the views of MacLeod and his associates (1977) in the "received uses of the technique" (p. 142). It is clear the most common procedure is that the modelling component demonstrates the required skills or behaviours to be acquired; the trainee is then informed of the salient behaviours by cueing (of some form). Often this is embodied within the material itself whilst at other times the implication is that the supervisor should act as the cueing agent. But no

attempt was made by the trainees to actually code or identify formally the behavioural instances for themselves. This view implies three possible components in the preparation phase of the microteaching format: skill definition, in which the behavioural indicators of a particular skill are described or defined; modelling, in which the trainee views, listens to or reads excerpts of the performance of the skill and in which cueing is used to focus attention; and discrimination training, in which students are expected to code lessons and receive feedback on their coding.

It is apparent that the differences in interpretation of the components, modelling and discrimination training, are more than an exercise in semantics. As will be seen shortly, there are serious implications for the design of research studies and for the interpretation of results depending on the "definitions" used. For example, there is already a large body of research evidence (as indicated in the previous section) which suggests that modelling procedures, which do not include the coding of lessons by students, are effective. Hence to include coding procedures with modelling, and to subsequently limit a comparison group of students to no modelling, could render the results of a study difficult to interpret and unrealistic to generalise to a practical training situation.

Review of Research Related to Discrimination Training

The impetus for this work came from several directions, but its major thrust in a microteaching sense came from the papers by Wagner (1972, 1973) in which she posed the hypothesis

> that, given motivation to change, cognitively learning to discriminate between appropriate and inappropriate behavior is *sufficient* for behavioral change to occur.
>
> (1973, p. 300)

Wagner indicated that support for the hypothesis can be found in early studies not related to microteaching but rather to the use of coding systems to analyse lessons. In the majority of these studies, in which trainees and practising teachers were trained to use systems like Flanders'

Interaction Analysis (Flanders, 1965, 1970), significant changes in the coders' performances were noticed in terms of the behaviours that had previously been coded (e.g., Amidon and Hough, 1967). Further support for the Wagner hypothesis came from several sources including Bandura's social learning theory (previously discussed) and from the work of Ausubel and Robinson (1969). Bandura later commented that "Observers who code modeled activities into either words, concise labels, or vivid imagery learn and retain behavior better than those who simply observe" (Bandura, 1977, p. 26). Ausubel and Robinson supported the idea that the clearer and more discriminable the skill concept is for the teacher, the more likely that skill will influence that teacher's behaviour under appropriate conditions.

What follows is a detailed review of the research literature concerning discrimination training, beginning with the Wagner study (1972, 1973).

Wagner (1973) randomly assigned 78 undergraduates to three experimental groups. All groups were given a brief description of the six sub-categories for the skill of teacher's response to a student's comment. They were then expected to prepare a five-minute lesson. The three groups then undertook differing treatments. The discrimination training group did not teach the prepared lesson but undertook a 30-minute coding session of a number of teacher replies. The teaching group presented the five-minute lesson they had prepared and after a review retaught the lesson to the same peer pupils. The control group did not teach the prepared lesson or receive any other treatment. All groups then prepared a further 10-minute lesson and presented it to a different group of peer students. The following week all groups were given a discrimination test comprising a number of teacher responses to code.

The hypothesis tested was that discrimination training was sufficient for behavioural change to occur. The results showed superiority for the discrimination training group over the other two groups in changing teaching behaviour. However, whilst the difference in scores between the discrimination training group and the control group were statistically significant on the discrimination test, there were no significant

differences between the other two groups. The hypothesis was supported and the finding of the study "substantially challenges some of the orthodoxies of the microteaching technique" (Malley and Clift, 1980, p. 127).

Several problems, however, are evident with the study. The first, raised earlier, relates to the lack of some modelling component for the teaching and control groups. There is evidence (see Gliessman and Pugh, 1978) that the reliance only on definitions is often insufficient background for students in the process of skill acquisition prior to practice. In the Wagner study it is not clear that the "brief description" given could be adequately described as skill definition. Hence the results may merely indicate that both the teaching group and the control group lacked appropriate initial knowledge. Further, since the teaching and control groups did not experience a modelling component, the chance for generalisation of the results to actual training situations is reduced.

Wagner may have been aware of this shortcoming when she indicated that the study did "not exclude the possibility that practice *in addition* to discrimination training may prove to be effective by serving other functions in the process of behavior change" (pp. 304-305), although this quotation has the potential for several different interpretations.

Also of concern is the threat to the validity of the experiment posed by two problems in the design. The first centres on the workload expected of the teaching group. The preparation and presentation of three lessons in what appears to be less than two hours seems to be overally demanding. The ability of undergraduate students who have had no formal teaching experience to cope adequately with this degree of input and expectation seriously undermines some of the impact of the results. Further concerns arise as to the students' attitudes to the experiment by all groups. How did the teaching group react to their heavy programme and did this affect their results? How did the discrimination and control groups react to their programme? Did they view as futile and a waste of time the preparation of the initial five-minute lesson which they were not required to teach? Associated with the above concern is the problem, also

acknowledged by Wagner, that "motivation to change", although part of the hypothesis, was addressed only informally.

Nevertheless, despite the above reservations, the data from this study suggest that there are benefits in modelling and discrimination training for skill acquisition and raise some doubts about the value and effect of practice on the acquisition of teaching skills.

Wagner (1972, p. 17) also suggested that there are five components which need to be considered if trainees are to adopt "new" teaching behaviours. These are to be able to

a) discriminate the behavioural instances,
b) learn to discriminate the cues given by the pupils,
c) learn to seek feedback from pupils,
d) recognise the desirability of the expected behaviour,
e) recognise that one's own behaviour differs from that desired.

It is clear from this list of components that Wagner saw a cognitive framework underlying the learning involved in microteaching, a contrast to the views apparently held by the majority of investigators into microteaching in the late sixties and early seventies.

An earlier study than Wagner's, which also considered discrimination training (although not explicitly), was carried out by Goldthwaite (1968). This study, which was concerned with the skill of presenting short science demonstrations, compared the performances of three experimental groups each consisting of ten students. One aspect of the study looked at whether students who had participated in the teach/reteach experience in microteaching would present demonstrations more effectively than those who had not participated in such experiences. The teach/reteach group taught, received feedback in the form of a verbal critique from peer pupils and retaught the lesson. The peer pupil group was composed of peers who had attended as pupils to at least four of the microlessons. In addition, the peer pupils as members of the microclass gave feedback to the student teacher. The critique the students supplied was on the basis of an evaluation form in which they noted key aspects of the skill being

examined. The third group acted as a control and did not participate in any of the microteaching sessions.

The criterion lesson occurred later in a practicum session in a secondary high school. Goldthwaite concluded by stating "the microteaching technique was apparently more beneficial to the students who were members of the micro-classes than to the students who presented the demonstrations" (p. 3021). Whilst no mention was made of the use of discrimination training it was clear that the microclass analysed and coded the skills presented by the student teacher. The student teacher, although receiving a verbal critique of the lesson presented, did not undertake any form of discrimination training. Hence, again, the value of discrimination training is highlighted and the effectiveness of practice is brought into question.

In a doctoral study, Kissock (1971) endeavoured to test the effectiveness of the "specific act" of microteaching as separate from the entire microteaching process. The study involved the development of higher order question asking behaviour among pre-service teachers. All of the 69 trainees received eight hours of instruction through the use of video and symbolic models. Half of the trainees also microtaught four five-minute lessons concurrently with the above instruction. The trainees in the microteaching group were superior in that they used significantly more higher order questions in the post-test lesson held immediately after the completion of the training programme. A similar lesson (retention test) held a further four weeks later, however, showed no significant differences between either of the two groups. Kissock stated "that microteaching may work primarily as a means by which a person can demonstrate what he has learned from an instruction program, but not as a vehicle for learning the skill itself" (p. 2532).

A concern with this study is the difficulty in relating it to realistic training programmes currently used in institutions. Few programmes, especially in Australia, could afford to allow eight hours of instruction time and/or four teaching sessions on one particular skill. The effect on the results of less instruction time and fewer teaching sessions is unclear.

Freyberg, Katterns and Rogers (1974) considered "the possibility of organising a microteaching programme so that participants learn specific skills...without deliberately practising them" (p. 2). They supported the possibility of this "vicarious learning" by the proposition that skills "are already usually part of a person's behavioural repertoire, but for various reasons they are not yet elicited...in a teaching context" (p. 3). To test this, the experiment involved 16 in-service teachers who acted as both teachers and pupils for differing pairs of selected skills. The teaching group was required to teach a 10-minute lesson, observe the performance which was analysed by peers and then reteach a similar lesson. The pupil group was required to analyse the microlesson usually by recording the frequency of various behaviours.

All subjects received skill definition, modelling and coding instructions before the differing treatments took place, but only the pupil group practised the codings. The criterion lesson, similar to an earlier pre-experiment lesson, was held approximately two months later using 12 school pupils from the teacher's normal class as the microclass for the test. The results of the analysis of these lessons were equivocal but the authors claimed further confirmation of the hypothesis "that vicarious learning will occur in a participant observer situation" (p. 16). However, one interesting finding was that the microteaching programme still appeared to be affecting the behaviours of the teachers some months after the study had finished. Further, these changes in the behaviours of the teachers often occurred despite the fact that in the session concerning the particular behaviours the teachers had only acted as peer pupils.

Two separate studies which have considered discrimination training in relation to microteaching were carried out at Stirling University. The first (MacLeod *et al.*, 1977) involved 77 pre-service teachers in a three-treatment group design over three skills, namely, variation, questioning and clarity of explanation. The groups were designed to cover all three skills at a different treatment level, with an 18-minute criterion lesson to be held at the end of the treatments. The major treatment consisted of: skill definition, a one-hour lecture explaining the theoretical and

practical rationale for each skill; modelling, a one-hour session in which three model tapes were shown, two of which were visually cued; discrimination training, a two-hour period in which students practised and discussed the codings of videotape lessons; and finally, a teach/reteach cycle in which 10-minute lessons were taught to school pupils and in which teachers were instructed to code their lessons during replay. The intermediate treatment group followed the skill definition and modelling components but not the discrimination training session, nor were they instructed to code their lessons in the replay sessions. The minor treatment group was simply given the skill definition session. Of the 14 criterion measures the major treatment group had higher scores on 12 of the measures but for only two (both aspects of higher order questioning) were the differences significant.

The results described above do little to clarify either the independent role of discrimination training or the independent role of the modelling component. They tend to show, however, that discrimination training adds to the effectiveness of practice.

In the second part of the experiment the results of the criterion lesson were examined in terms of three subject specialisation areas, English, History and Other (made up of Mathematics, Science and Modern Languages.). This time significant differences were noted on 10 of the 14 measures. MacLeod and McIntyre (1977) drew three conclusions from the results

> First, although there is a clear trend for microteaching with discrimination training to lead to superior performance of the skills, this trend is in general overwhelmed by the extent of the individual differences among students.
> Second, the effect of discrimination training and microteaching is very much greater for one of the skills [questioning] than for the other two.
> Third, differences due to treatment are generally small compared with differences according to subject specialism.
>
> (pp. 257-258)

The second study (Batten, 1978) carried out at Stirling consisted of three separate but related experiments. One of the experiments involved a microteaching group and an "alternative programme" group made up of 31 and 30 pre-service teachers respectively. Both groups participated in equivalent sessions of microteaching practice and feedback. The only difference in content between the programmes of the two groups was the inclusion of discrimination training into the preparation phase of the "alternative programme" group. The results of the experiment, while indicating improvement in both groups over pre-treatment measures, found the "alternative programme" group superior on 14 of the 16 measures when compared with the microteaching group. Batten (1978) saw these results as "consistent with the conclusions of Wagner" (p. 398) and lending some support to the findings of MacLeod *et al.* (1977).

Batten (1978) concluded that "there was quite promising evidence for the inclusion of discrimination training in the format of a micro-teaching programme" (p. 400). However, he added that there was need for further investigation of the effects of discrimination training as "it must be recognised that there are gaps in the evidence presented" (p. 400).

In the United States the move to examine the role of discrimination training in skill acquisition started by way of the protocol materials development movement. This movement, described earlier, prepared materials to enhance concept acquisition of teaching skills rather than observable teaching behaviours of pre- and in-service teachers (Smith, 1969; Gliessman, 1972). However, the need to "prove" the worth of the materials produced in terms of government funding for future projects and sales to other training institutions, has led many researchers into clarifying the role of concept acquisition through concept based training (Kleucker, 1974; Gliessman *et al.*, 1979a). Gliessman (1981) took up this point and stated that

> Viewing a teaching skill as a concept to be acquired implies that the immediate goal of instruction is conceptual: To be learned are the essential characteristics of a skill, its specific uses in teaching, and how it is distinguishable from other skills. Mastery of a concept may be tested by the ability to correctly identify new examples of a skill in a filmed or videotaped

> protocol, to construct new examples, or to apply the concept in the interpretation of teaching situations.
>
> (pp. 5-6)

This quotation highlights two important points. First, that concept learning is but a synonym for discrimination training and, second, that a cognitive framework might be appropriate for viewing the processes involved in the acquisition of teaching skills.

Hence the evaluation and examination of the outcomes of using these protocol materials whilst initially conceptually different became strikingly similar to the investigations by Wagner (1973), MacLeod and associates (1977) and Batten (1978). These investigations had two related functions. The first was to clarify the role of concept based training (i.e., discrimination training) in the development of behavioural instances of various skills. The second was to identify key components of the microteaching format and, more generally, the processes involved in learning how to teach (Kleucker, 1974; Gliessman *et al.*, 1979a; Gliessman, 1981).

What follows is a description and discussion of several papers related to the protocol movement which have discrimination training as an aspect of their experiments.

Kleucker (1974) attempted to answer several questions related to the differences (if any) between protocol materials and training materials (Smith, 1969; Gliessman, 1972). However, an examination of the experiment showed that the treatments used allowed a close inspection of what are potentially key elements in the preparation phase of a microteaching programme. The study involved 38 undergraduate students who were randomly assigned to four treatment groups. The first group was instructed with protocol materials only, the second used training materials only, the third used both materials, and the fourth, which acted as a control, was given neither material. The two skills used in the study were probing and accepting. Students in the "protocol instruction" group were trained in

the "conceptual understanding and the interpretive use" (p. 4) of the skills. In this component of the course the experimental instructor

1) presented a rationale for learning the two concepts.
2) defined one of the concepts.
3) had Ss [students] use the concept in analyzing the protocol film.
4) had Ss respond to the written exercises.
5) presented a summary of the concept.
6) repeated steps 1-5 until all parameters of both concepts had been covered.

(p. 9)

Clearly this procedure was equivalent to a discrimination training session and Kleucker also stated that "At no time did Ss attempt to practice or use the related skills" (p. 9).

Students in the "training instruction" group were trained in the skilled performance of these behaviours. In this component of the course the experimental instructor

1) presented a rationale for learning the teaching skills.
2) presented definitions and written examples of both skills.
3) had Ss practice writing probes and accepting reactions.
4) had Ss respond to an audio stimulus tape with probes and accepting reactions.
5) had Ss teach three microteaching lessons in which they used the two skills.
6) had Ss view and evaluate the videotapes of their microteaching performances (with feedback provided by the instructor and another S functioning in the role of a peer-supervisor).
7) had Ss observe three microteaching performances of another S and serve as a peer-supervisor in helping him evaluate his performance.

(p. 10)

Again this is similar to a teach/reteach component in microteaching with the provision of a second reteach. Although one may question the amount of implied discrimination training that must have taken place for points 3, 4 and 7 (above) to be performed satisfactorily, Kleucker emphasised that "The basic purpose and focus of the skill training

instruction was at all times one of skill development and not...one of conceptual development" (p. 10).

All students, including those in the control group, were given brief definitions of the skills prior to the testing. The testing took two forms: the first was a five-minute microteaching lesson to 4-5 junior high school pupils, and the second was a concept acquisition test which consisted of coding a 25-minute video-taped lesson and a printed concept test. The results showed that there were no significant differences between the "protocol instruction" group and the "training instruction" group, not only on the concept acquisition test scores but also on the skill performance scores.

The doubts mentioned previously about the "quasi" discrimination training included within the "training instruction" group could well explain the absence of significant differences in the results of the concept acquisition test. The lack of superior performance by the "training instruction" group is interesting, especially as the "protocol instruction" group did not practise the skills. This result lends further support to the conclusion reached by Wagner (1973) that practice may not be necessary in order to acquire particular skills.

When the third group, the "protocol and training instruction" group which received both treatments, was compared with the "protocol instruction" and "training instruction" groups, it achieved significantly better results in the concept acquisition test, but there were no differences between the groups in terms of performance scores. This last result appears in contrast to the conclusions drawn by Kleucker which stated that a combination of conceptual and performance training is "likely to lead to the greatest amount of conceptual and performance gains" (p. 24). In addition the increase by a factor of two of treatment time for the third group over the single treatment groups could well explain the differences in concept acquisition test scores. However, once again the lack of differences in performance scores seems to suggest further support for a questioning of the role of practice, despite the inequality of treatment times.

One further consequence of the results, although not addressed formally by Kleucker, could have major ramifications for teacher training. She concluded that if only one type of instructional material is to be used "cost, ease of use, resources available,..." (p. 24) should be the basis for choice. Since the performance levels were similar for both training techniques, one possible criterion which could have been applied in order to indicate superiority was a cost benefit analysis. Had this been done, the results would, in general, have favoured the concept training technique (cognitive discrimination training) as it lacked the need for expensive recording equipment and the use of microlessons which are relatively costly in a variety of ways for training institutions, staff and students. The only problem with this generalisation, however, is the possible variation in the students' reactions to the different training techniques. It is unfortunate the participants' reactions to the differing treatments were not considered as part of the experimental design.

Gliessman, one of the principals in the protocol materials development movement, was involved in the development of the *Concepts and Patterns in Teacher-Pupil Interaction* film series which emanated from the University of Indiana; it was these protocol materials that Kleucker used in her study. Gliessman produced a series of papers with Pugh (1978, 1981) and with Pugh and Bielat (1979a,b) which tried to determine key aspects involved in both conceptual skill acquisition and behavioural skill acquisition.

The first of the above papers (Gliessman and Pugh, 1978) reported an experiment, the design of which arose as a reaction to the comments of Cruickshank (1974) who suggested that "concepts can be gained quickly through definition. Projects seemed to run amok visually illustrating concepts. Concept overkill may have resulted" (p. 302). Pursuing further previous indirect evidence from a study (Pugh and Gliessman, 1976) in which the treatment component included discussion and analysis as well as filmed exemplification, Gliessman and Pugh (1978) undertook a study "to assess directly the relative influence of concept definition and concept exemplification" (p. 88). They formed four experimental groups, the treatments

for each being: concept names only; concept names and definitions; concept names, definitions and video examples; concept names and video examples. The results showed that "The exemplification of concepts on protocol films,...apparently contributes significantly to concept acquisition" (p. 89) and that "concept definitions alone do not produce effects equivalent to those achieved through exemplification of the defined concepts" (p. 89).

The major problem with the study was the time difference it took to undertake the differing treatments (as with the Kleucker study this aspect could account for some or many of the differences identified). Their basic conclusion, however, found agreement in other studies reported (e.g. Bandura, 1977).

A second study (Gliessman, Pugh and Beilat, 1979a) more closely observed the effects of discrimination training on the acquisition of teaching skills, and as a second aspect attempted to relate concept acquisition scores to skill performance scores. In this study, 20 practising teachers were assigned to two groups (a training and control group), so that each group was equivalent in terms of years of experience and proportion of males and females. The focus of the experiment was on the *Concepts and Patterns in Teacher-Pupil Interaction* films which included the concepts of: reproductive and productive questioning; probing and informing; approving and disapproving. Prior to the microteaching session, probing and informing were selected as the skills to be critically analysed.

The training group spent three to four hours on discrimination training and then, after teachers in both groups were given five minutes of skill definition, a concept acquisition test was given. Following this, six hours were devoted to all students preparing a 15-minute lesson in which they were given a printed copy of instructions which "were designed to be sufficiently specific to elicit the criterial skills (if the referent concepts had been acquired), while not so specific as to stimulate a rote display of the skills" (p. 152). The results indicated that the training group scored significantly better than the control group in the concept

acquisition test and in the criterion lesson, thus confirming "that effective concept-based training can influence skill acquisition without the use of overt practice in the criterial skills" (p. 152).

The second aspect of the study examined the correlational relationship between the concept acquisition scores and the skill performance scores (r = 0.51). This result suggested that the higher the degree of concept mastery, the higher the degree of skill frequency performance. The implication was that "a high degree of concept mastery might be a direct means of assuring skill acquisition" (p. 153). Overall this study gives an indication that skills can be acquired without direct practice, but it does not allow the opportunity to consider the effects of a practice component. Further, it does not allow any determination of the measure of skill acquisition that might accompany a practice component. In a later study (Gliessman *et al.*, 1979b), described below, this correlational relationship was not confirmed.

In this second study (Gliessman *et al.*, 1979b), 30 practising teachers undertook a similar programme to those of Gliessman and colleagues (1979a). This included a discrimination training programme using the Concepts and Patterns series. Again the critical skill was taken to be probing. At the conclusion of the 10- to 15-minute criterion lesson the students were given an audiotape of their teaching session and asked to analyse it in terms of the questions:

> Did you consciously attempt to use any interactive skills? Which ones? Why did it occur to you to use them?
>
> (p. 11)

The responses, which varied in length from one paragraph to several pages, were then analysed for "evidence of conceptual, observational and nominal influences in their use of the interactive skills, particularly the skill of probing...[and] for evidence of the ability to use the concept of probing interpretively, specifically on the criteria of accuracy and application" (p. 11). As noted above, the results found by splitting the sample into two groups of 15, based on the median skill frequency, showed

no significant differences between the skill concept acquisition mean scores. In addition, the analysis of the teachers' written responses yielded an unexpected result. Whilst there was evidence of conceptual and nominal outcomes of training, there was no evidence of observational effects. The authors, in an attempt to explain this result, whilst admitting that a possible direct answer would be that "observational effects are simply unimportant to the acquisition of probing as a skill" (p. 16), qualified this with two comments. They felt that possibly the questions asked by the researchers might not have cued the teachers into attending to the unverbalised process. However, more importantly, it may have been that observational learning of an unverbalised behaviour may not have been relevant to the acquisition of a verbal skill such as probing. The implication from this last point could be that verbal and nonverbal skills require different training outcomes.

Before concluding this section on discrimination training it is pertinent to refer to a paper by Hargie and Maidment (1978). This paper was concerned with the implications of the discrimination training component in microteaching on teaching practice. In addition to discussing the studies of Wagner (1973), Kissock (1971) and Goldthwaite (1969) which queried the role of discrimination training, they also discussed a further four papers. They suggested that the results of these papers (Kallenbach and Gall, 1969; Waimon and Ramseyer, 1970; Peterson, 1973; Yorke, 1977) could be interpreted in a different light if the role of discrimination training was exemplified.

Kallenbach and Gall (1969) divided 37 subjects into two training groups. The first group taught for 10 hours per week for an average of five weeks in a local school and the second group carried out the micro-teaching programme of teach, review/discuss, replan, reteach, etc. This lasted for approximately one hour per week over a period of seven weeks. The analysis of the results showed no significant differences between the two experimental groups and this led the investigators to the conclusion that the microteaching programme was more effective than the practice teaching programme because the microteaching group achieved the same results in one-fifth of the time.

However, Hargie and Maidment believed that the investigators failed to consider the possible effects on both groups of participants of sessions in which "specific teaching skills in the areas of lesson preparation and presentation and teacher-pupil rapport were discussed" (Kallenbach and Gall, 1969, p. 137). It is likely that these sessions could have been classified as discrimination training sessions and that this could have accounted for the later equivalence of performance of both groups.

Waimon and Ramseyer (1970) used 40 pre-service teachers who were randomly assigned to four experimental groups. The experiment was primarily concerned with the effects of varying forms of feedback. For example, in three of the four groups there was no supervisory conference and the focus of the camera was on: the pupils; the pupils and teacher; and, the teacher. The fourth group, the control, used no audio visual feedback but included a supervisory conference. The results indicated no significant differences among the four groups. However, discrimination training was a component in the skill preparation phase for all groups. Once again a possible reason for the lack of differences evident in the four groups could have been due to the presence of the discrimination training component.

Peterson (1973) assigned a sample of 24 elementary student teachers to two groups. The first group took part in a discrimination training programme which consisted of: an explanation for the rationale of 13 specific questioning skills; watching a 20-minute film; and watching a 10-minute lesson in which a teacher modelled the behaviours which were coded by the students. Finally, the students prepared and presented a microlesson which was in turn reviewed with the help of a supervisor. The lessons were then re-taught to a different group of pupils. This procedure was repeated for the remaining behaviours. The second group followed a similar programme but the microteaching component was omitted. All the students were tested some seven weeks later in a practice teaching environment and no significant differences were found on any of the 13 behaviours.

Peterson concluded that the seven weeks of practice teaching were so busy and the students so worried about class control and lesson preparation that they would not have been able to concentrate fully on the skills. Another satisfactory explanation might have been that discrimination training was the active element in the learning of the specific skill. Since both groups completed the discrimination training component the equivalence of performances might have been expected.

Yorke (1977) conducted experiments with 37 students, in their first term teacher education course, who were divided into two groups. The experimental group, comprising initially 16 trainees, developed their teaching competences through devising lessons and teaching them to approximately 15 pupils. The lessons were video-taped and feedback was given. The control group of 21 trainees was wholly lecture-based and included discrimination training on all six of the teaching skills. The results of the experiment showed no significant differences, the criterion being the performance of pupils who were taught by a subset of volunteers from both groups on a multiple choice test. Whilst there were several concerns about the design, some of which were acknowledged by the author, the results could be seen as indicating the importance of the discrimination training component in the programme.

Hargie and Maidment summarised their review of the above studies by suggesting "that discrimination learning is a critical feature in the training of skilled performance in teaching" (p. 92) and that maybe this component influenced skill acquisition more than the practice component. However, they also balanced these comments by observing that it cannot be assumed "that all of the central features of classroom teaching can be identified and discriminated" (p. 92) and that other useful aspects of teaching such as attitudes and confidence may be affected by practice.

It is clear that findings similar to those explained by Hargie and Maidment can be found elsewhere, namely, in Borg, Kallenbach, Morris and Friebel (1969), Wallen and Utsey (1969) and Langer and Allen (1970). As one example, Borg and associates (1969) devised an experiment in which three groups undertook different treatments. The first took part in a

microteaching session with feedback; the second took part in microteaching but without feedback; and the third observed the same model as the other two groups but had no microteaching practice. The results showed no significant differences among the three groups as a result of the differing treatments, although all groups had changed significantly. The common element that may have accounted for the change could have been the observation of the model and the subsequent discrimination training that took place when "the student teacher was asked to identify each of the three behaviors on a checklist as it occurred. ...[and in] a second form...the narrator named each behavior as it occurred so that the student teacher could check his ability to recognize the behaviors" (Borg *et al.*, 1969, p. 11).

The preceding discussion has indicated that discrimination training may play a potentially critical role in the acquisition of teaching skills. It has also been suggested that it is possibly this component, when present in the preparation phase of different treatment groups, that may account for the equivocal results found in many studies investigating skill acquisition. Further, some of the results of past investigations may be reinterpreted in the light of the possible significance of the discrimination training component. The discussion has also highlighted a change, particularly from the Stanford programmes, in the way some researchers view the process of skill acquisition; that is, associated with the increasing prominence given to discrimination training is the emergence of a cognitive perspective to skill acquisition.

Two problems arise from the studies that have been undertaken that preclude outright acceptance of this critical role of discrimination training. The first relates to the inadequate description of the preparation phase in many studies and the subsequent lack of clarity of the terms, skill definition, modelling and discrimination training. The second relates to the problems that emerged when consideration of the design of the studies was taken into account. Such problems included: the small number of students involved; the unclear or inadequate nature of the initial information supplied to different groups of students within the

study; the allowance of different time periods for competing treatment groups; and the lack of generalisation of the study to real programmes in training institutions. While these problems did not all occur in any one study their general prevalence throughout the literature is enough to cause some concern.

As a result of the evidence on the possible importance of the role of discrimination training that has been reported, doubts must gather about the effect of practice in microteaching. That is, is there value in the teach or the reteach lessons? Is practice essential to the students' acquisition of teaching skills? The following section considers the research literature related to practice.

THE PRACTICE PHASE

This section considers initially the role of practice in skill acquisition. Following this, three additional aspects related to the practice phase, namely, the length of the lesson, the size and composition of the class, and the time interval between subsequent teaching sessions, are discussed.

The Role of Practice

> Practice, practice, practice. ...Not just any kind of practice..., but frequent, varied and criticized practice. Observation, immediate feedback, and practice again to perfect the original performance. Practice in a variety of situations, ...the clear message is the power of such practice in building competence and confidence.
>
> (Bush, 1977, p. 6)

The word "practice" has several uses and meanings. At a general level, the *Oxford Dictionary* defines practice as "action as opposed to theory" or as a "repeated exercise in an art, such exercise done merely to improve skill". The former definition may be applied to student teaching practice and can be considered more as "general experience" (Gliessman,

1981, p. 8). This differs substantially from the latter definition given above which is essentially what is intended in microteaching practice. Also pertinent to this is Gliessman's (1981) definition which saw practice as "performing under controlled conditions with the intention of improving one's performance" (p. 8).

In the Stanford programmes practice was seen to be an integral part of the microteaching format. Microteaching was seen to allow "for the increased control of practice" (Allen and Ryan, 1969, p. 2). Allen and Ryan (1969) saw practice as "essential". They believed that

> Practice is, of course, a prerequisite for many learning activities. ...[and that] much of a teacher's day is devoted to activities that are learned and can be improved through practice.
>
> (p. 3)

They also added that

> There are few teachers who would not benefit from the highly focused practice and feedback which are the basic components of microteaching.
>
> (p. 9)

Often the acceptance of the value of practice by many writers is seen to be so evident that no comment on its use is made. However, several writers saw the practice component as critical for skill acquisition and specifically made mention of it. For example, Koran and Koran (1974) saw practice as "a critical factor in learning any teaching skill" (p. 8). Bush (1977) in discussing lessons to be learnt by research into teacher training spoke of "the importance of practice" and went as far as suggesting that it "may be one of the most important" (p. 6) aspects.

Hudgins (1974), in generalising results from studies outside the field of teacher education, stated that with slight modification "there is evidence on all hands that the characteristics of skilled performance...do not emerge unless large amounts of practice with the skill are undertaken"

(p. 9). He also referred to the benefits of "both permitting and encouraging trainees to continue practicing a skill until they have mastered it, or until an acceptable criterion has been achieved" (p. 30).

Borg (1977), in discussing changes in teachers' performances using Utah State University Protocol Modules, spoke of the need for "More practice...for teachers to incorporate the behaviors into their teaching in a natural fashion...[and] to give teachers an opportunity to try out the behaviors they had learned in different combinations and to try to fit these combinations of behaviors into their own style of teaching" (p. 13). Perhaps as a consequence of this overt or (more often) implied acceptance of the importance of practice very little direct research has been carried out to determine the value or the effects of practice. MacLeod and his associates (1977) noted this point when they stated "the role of practice in microteaching has been neglected" (p. 142).

As a balance to the favourable comments outlined above, several investigators have challenged this critical role attributed to practice although few have sought to investigate the effects of practice. Kleucker (1974), for example, wrote that "Certain teaching skills, particularly those which are already within the average teacher trainee's behavioral repertoire to some degree (e.g., questioning skills), may be acquired with minimal practice" (p. 25). However, she did not rule out completely the value of a practice session and concluded that "Other skills, particularly those which are not already within the average teacher trainee's behavioral repertoire or are highly complex in nature, may require repeated practice with feedback in order for the trainee to acquire the skill" (p. 25). Unfortunately, neither the nature of these behaviours nor the particular skills were identified.

Studies by Koran, Snow and McDonald (1971) and Santiesteban and Koran (1977) also cast doubts on the value of practice sessions. Their studies were more concerned with comparisons between modelling in conjunction with practice and practice alone. Hence clear conclusions as to the value of practice were not evident.

One of the experiments in the Batten study (1978) also allowed for consideration to be given to the role of practice. In this experiment he compared two groups, a control group and a microteaching group, made up of 42 and 79 pre-service teachers respectively. The control group took part in exactly the same programme as the microteaching group with the exception of the practice/feedback components. The preparation phase for both groups consisted of the skill definition of questioning behaviours, classroom transcripts which exemplified the behaviour, materials to be coded by students, the opportunity to prepare lesson materials which included the behaviour and finally, cued film sequences (p. 397). As mentioned previously, the microteaching group then practised the skill and received feedback. The results indicated significant differences between the two groups on only one of the 16 measures employed (an aspect of higher order questioning). Batten, in summarising the findings, suggested that "some doubts must gather regarding the importance, or indeed necessity, of the microteaching practice and feedback for the development of the desired behaviours" (p. 394).

Other studies such as those from Wagner (1973) and Gliessman and associates (1979a), discussed in detail previously, although concentrating particularly on the discrimination training component, also challenged the value of the practice component.

In all the studies described above, the comparisions always involved at least one treatment group that was denied practice. However, an alternative approach which also allows for the examination of the effects of practice considers the merits of the reteach session(s) over the teach session. While in the early programmes (e.g., at Stanford), the reteach sessions were seen to be valuable, there has been growing concern that this is, in general, not the case. Brown (1973), for example, found that the reteach scores were almost always lower than the initial teach scores.

One study that looked at aspects of repeated practice (although the study's primary concern was with cost effectiveness) was carried out by Clift and his colleagues (1974, 1976). In this study, 72 students were randomly assigned to treatment groups. The main hypothesis was related to

the effects of differing modes of feedback on either three or five reteach sessions. All lessons were five minutes in length and were followed by a ten-minute feedback session. The reteach lessons occurred on consecutive days. The investigators found that "Each experimental group showed a significant mean improvement between first and last sessions" (Clift *et al.*, 1976, p. 195). However, while the mean scores for trainees who had participated in five reteach sessions were higher than those achieved by trainees who had participated in three reteach sessions, the differences were not significant.

The value of practice from these results is not clear. One problem in interpreting the results relates to whether the 'first teach' was the student's first performance in a microteaching setting. The description of the study does not make this aspect clear. As the initial teaching performance in a microteaching setting is in general renowned for its low performance scores, this might well call into question the significant results attributed to the change in performance between the first and last lessons. Clift and his associates also reported some large individual differences that were at variance with the general trends and stated, "a few students who were spread across the groups showed no improvement, and there were some whose performance was rated as actually deteriorating over the total programme" (Clift *et al.*, 1976, pp. 195-196). The investigators suggested that this "deteriorating" performance may be due to an "aptitude-treatment interaction...or...student reaction to the technical skills approach" (p. 196). It is unfortunate that the investigators did not monitor the students' attitudes to the repetitive nature of the task in an attempt to determine if this aspect might have been a possible factor in explaining the results.

Other studies have considered the attitudes of students. Brown and Gibbs (1973) commented that students often expressed a strong dislike for the reteach sessions. These findings were mirrored by Reid, Gibbs and Roe (1976) when they also noted that in their pilot study trainees and tutors criticised the reteach sessions, seeing them as "frustrating, time consuming and of little help" (p. 9). While it is unclear if it is the evidence on performance scores or attitudes that has affected the perceived

value of the reteach session, it is apparent that the majority of training institutions now neglect the reteach session (Hargie and Maidment, 1979; Jones, 1979). Instead, most programmes appear to have adopted a skill definition/model/teach/feedback format.

From the preceding discussion no clear insight into the role or value of practice has emerged. Of particular interest is the lack of confirmation in recent studies of substantial performance gains achieved with repeated practice when these gains were so evident in earlier programmes. A possible explanation for this change in the perceived value or role of the reteach session could be related to the substantial improvements that have been made, not only in the quality, but also in the availability of modelling materials which are used in the preparation phase. In the early days of microteaching, such materials were not as readily available and hence questions must arise as to the degree of students' awareness of the skill to be acquired prior to their first teaching lesson. It would seem plausible that early programmes relied (maybe unknowingly) on the first teaching session of a skill as a means of explaining and describing the skill. This being the case, then the improvements noted in early programmes may be due mainly to the skill exemplification that occurred in the teach session and not as a consequence of practice.

Clift and his associates (1974) acknowledged this possibility and, as a possible limitation to their study, they suggested that "Concern with the teach/reteach cycle was also reinforced by the lack of resource materials available at that time [1972] for use in the pre-teach situation" (p. 120). Hence, in more recent times, the lack of gains in performance scores between the teach and reteach sessions may be more a result of the effectiveness of the modelling materials used rather than a decline in the effect of practice.

It is apparent, therefore, that there is some conflict in the views many educators hold towards the benefits of practice. On one side there is a questioning of the value of practice and this is mirrored in the large decline, world-wide, in the use of reteach sessions. While the cost

benefits of not including a reteach session may account for some of this decline, it appears that there is general widespread dissatisfaction with the benefits to be gained from such a session. As a contrast to this comment, many of the same educators support the notion of the importance, or even the critical nature, of practice in skill acquisition.

Before concluding this section, three further aspects of the practice phase in microteaching, which have been the subject of research, are examined.

Three Further Aspects of the Practice Phase

The first aspect considers the length of the microlesson. Little work has been carried out on the optimum length of such a lesson. Convention has set the limits between five minutes and ten minutes, but both longer and shorter lessons are often used. Stanford researchers indicated that five minutes was sufficient and that the length of the lesson did not appear to be a major factor in skill learning (Allen and Ryan, 1969; McKnight, 1971).

Hargie and Maidment (1979) in discussing the programme used at Ulster College talked of using ten-minute lessons for practising most skills and 15 minutes for the skills of set induction and closure. In addition they used the microteaching format as a means of preparing students to teach longer lessons in their own subject area. As a consequence of this the students experienced three to four 15- to 25-minute teaching sessions in the course of the programme each week during the latter weeks. McAleese (1973) also suggested that as progress is made the length of the lesson and the number of pupils can be increased to "simulate" the real classroom more accurately.

The second aspect considers the size and composition of the microclass. The actual number of pupils in a microclass in many programmes seems to be based on a pragmatic decision determined by the contingencies surrounding that particular programme. In general, it would seem that three to six persons is the average number. One study that considered the

size of the class in microteaching was carried out by Staley (1970). In this study he examined classes of 4, 8 and 12 to 17 peer pupils but found no significant differences in the effects on the trainees' subsequent teaching performances.

The composition of the microclass, that is, the use of school pupils or peer pupils, has been the focus of much more research. The results, however, have not been conclusive. Several studies (Collofello *et al.*, 1970; Doty, 1970; Johnson and Pancrazio, 1971) showed no significant differences in teaching behaviour between trainees who taught peers or school pupils, whereas other investigators (Wood and Hedley, 1968; Peck and Tucker, 1973) reported opposite results. There seems to be a clear indication from research that trainees prefer to teach school pupils in their microlessons. However, as a balance to this, Turney and colleagues (1973), when commenting on a report from Macquarie University by Levis and his associates (1973), stated that the trainees "agreed that (i) teaching peer groups did not inhibit their performance and that it was not difficult to play the role of a peer pupil; (ii) peer group classes provided more effective feedback than school pupils and that 'acting as a peer pupil sensitized them to the skills being practised'" (p. 16). This latter point was also supported by Goldthwaite (1969). His study found that a benefit of having trainees act as pupils was that they acquired the skills without having practised them.

There appear to be two further related problems associated with the use of school pupils and these have been mentioned in the previous chapters. The first involves the cost in terms of money and time taken organising and using school pupils. The second is the ethical question regarding whether school pupils should be paid and, if so, how much?

The overall effect of the equivocal nature of the research, the value in peers being pupils and the problems associated with using school pupils has resulted in the majority of programmes now using peers as pupils in microlessons (e.g., Jones, 1979).

The third aspect considers the time interval between teach and reteach sessions. Studies trying to determine an optimum time difference between consecutive teaching sessions have also not been conclusive. Cooper and Stroud (1966) determined that a 15-minute delay was not sufficient for significant behavioural change to occur. Allen, Fortune and Cooper (1968) suggested that one hour was insufficient, whilst Borg and his colleagues (1970) suggested a 24-hour gap between teach and reteach sessions in their minicourse programmes.

An opposing view was given by Turney and his associates (1973) when reporting on investigations by Levis and his colleagues (1973). They stated "that there was no significant difference in the reteach between students who had a 'refinement break' of twenty minutes and those who had a period of one week in which to revise their lesson" (pp. 25-26). Overall there is no clear evidence to indicate an optimal time period between the teach and reteach sessions.

From the preceding discussion it is evident that there has not been a great deal of research related to the practice phase of micro-teaching. There are perhaps two reasons for this. The first is the acceptance of the need for and importance of practice by many educators. It seems clear that expressions of the form "practice makes perfect" resound throughout training institutions as they do in sporting circles. Many educators appear to accept such statements. Some see it differently.

Batten (1978) questioned the role of practice when he suggested that, from the results in his study, "it was possible to conclude that the microteaching practice element had only a limited role in the achievement of the results reported" (p. 395). Freyberg and associates (1974) went even further and they proposed that "deserving of consideration is the possibility of organising a microteaching programme so that participants learn specific skills...without deliberately practising them" (p. 2). They supported this suggestion by maintaining

> that the real value of microteaching for developing teaching competence may well lie in its increasing the sensitivity of

> teachers to the complex interaction of factors in the teaching situation, rather than in the opportunity for practice of specific skills.
>
> (p. 1)

The second reason for the small amount of research related to practice is the difficulty inherent in examining this aspect. Gliessman and Pugh (1981) acknowledged this when they stated that when practice is defined "narrowly as the performance of a skill or set of skills with a view to their improvement, the influence of *practice alone* is still a decidedly elusive phenomenon to demonstrate" (p. 17).

In addition to the evidence presented which questions the value of practice as it is related to skill acquisition, a further issue arises. This concerns the question of what framework or model possibly describes the learning process in skill acquisition. Many educators (e.g., McDonald, 1973) who believe practice to be critical would see a behaviouristic model as underpinning the learning process. However, this model, with its mechanistic implications of "training" rather than "educating" potential teachers (Seidman, 1969), was not well received, as McDonald himself testified. Alternatively, several investigators suggested that a cognitive model may best describe the learning process in skill acquisition. This issue is considered in the next section where the literature related to frameworks and theories which are believed to underpin the process of skill acquisition are discussed.

THEORETICAL FRAMEWORKS FOR MICROTEACHING

> ...the majority of teacher educators who have implemented microteaching have given scant attention to the theoretical basis of their own practice.
>
> (Griffiths, 1977, p. 191)

These views were shared by several investigators (e.g., MacLeod and McIntyre, 1977; Hargie, 1977; Malley and Clift, 1980) who also commented on the lack of generalisability and utility of much of the

research directed at variables within and aspects of the microteaching technique. For example, "Despite literally hundreds of investigations into microteaching and its various components, only little that is conclusive or reliable can be said about its value or effectiveness" (MacLeod and McIntyre, 1977, p. 253). Several reasons could explain this situation and they include "the inappropriateness of some comparative studies..., and the precipitous rush to pragmatic experimentation" (*ibid.*, p. 253). However, it seems that the major reason for the prevalence of this inconclusive information relates to the lack of a theoretical framework in which the different studies were set. MacLeod and McIntyre (1977) expanded on the implications of this when they stated

> Experimental research is of crucial importance in testing hypotheses derived from coherent theories; but in the absence of such theories and hypotheses, experiments are almost certain to leave one as ignorant on their completion..., as one was when one started.
>
> (p. 254)

Several investigators have proposed models or theoretical frameworks for microteaching. However, most researchers and practitioners have tended to ignore them. McKnight (1979), who worked at Stanford as a postgraduate student in the sixties, believed that at least four different rationales underlined the initial developments at Stanford. However, despite several early theories, most research into aspects of microteaching tended to be concerned with "experimental design and data analysis...with little attention given to examining questions about the validity of their measures or the relationship of definitions and measures to a theory of teacher behaviour" (Malley and Clift, 1980, Preface).

There appears to be a growing acceptance by several researchers that if meaningful and useful results in microteaching are to be achieved by research then research questions must be posed within some framework. McKnight (1979), when listing areas that required further investigation, stated "in the order of priorities, attention to a useful paradigm must come first" (p. 25). The next section of this chapter addresses the

question of what frameworks have been proposed for learning processes that underlie microteaching.

Research Literature Related to Theoretical Models

The various models related to microteaching will be discussed in three sections which, in part, are adapted from that proposed by McKnight (1979) and MacLeod (1981a). The first section considers: models derived from the Stanford programmes which include the "pragmatism" of Allen and Ryan (1969); the "microeffectiveness" of Gage (1963); the "programmed instruction and task analysis" of Berliner (1969); and the "behaviour modification" of McDonald (1973). The second section considers the social skills model of Argyle (1970) and the third considers three cognitive models suggested by Fuller and Manning (1973), Bierschenk (1974) and MacLeod and McIntyre (1977), respectively.

Models from Stanford Programmes

McKnight (1979) saw four different perspectives behind the development of the Stanford programmes, which reflected "the variety of assumptions and approaches which were brought to the development of the skills" (p. 9). The pragmatic nature of many of the decisions was freely acknowledged by Allen and Ryan (1969), and these have been mentioned in Chapter 1. In a later description, Allen (1978) again took up this theme

> In the early phases of our experimentation and research, we deliberately eliminated conceptual frameworks and theoretical constructs as we searched for a method which consistently showed results - a system that "worked" was needed rather than one which was theoretically sophisticated. Our belief was that a theoretical structure for microteaching would evolve out of application and practice.
>
> (In Ivey and Authier, 1978, Preface, p. xix)

A consequence of this was that any of the initial discussions regarding rationales (see Allen and Clark, 1967; Allen and Ryan, 1969) always tended to list a summary of perceived advantages.

Gage (1963) talked in terms of "the development of the notion of 'micro-effectiveness'" (p. 120). He suggested that rather than regard teaching as a single global entity and "seek criteria for the over-all effectiveness" (p. 120) it may be more efficient to use an analogy with scientific investigations. Using this approach "Many scientific problems have eventually been solved by being analyzed into smaller problems, whose variables were less complex" (p. 120). Later Gage (1968) suggested that

> What is important is the approach - the attempt to analyse teaching into limited, well-defined components that can be taught, practised, evaluated, predicted, controlled and understood.
>
> (p. 124)

Support for this approach was given by Flanders (1963), who wanted teaching described in terms of a series of acts, and by Morrison and McIntyre (1973) who felt that it was only possible for trainees to pay attention to a few details at a time when learning to teach.

Berliner (1969) believed that notions of programmed instruction and task analysis underpinned microteaching. He was supported in this by Peck and Tucker (1973) in what they characterized as a "systems" approach. They described this approach as a series of steps which could be repeated in cyclical fashion. It consisted of

> 1. Precise specification of the behavior which is the objective of the learning experience;
> 2. Carefully planned training procedures aimed explicitly at those objectives;
> 3. Measurement of the results of the training in terms of the behavioral objectives;
> 4. Feedback to the learner and the instructor of the observed results;
> 5. Reentry into the training procedure...;
> 6. Measurement, again, of the results following the repeated training.
>
> (p. 943)

Berliner took concepts like "performance criteria" and "criterion behavior" and applied them to a microteaching context as he felt they were

"clearly recognizable by trainees and supervisors, and evaluation of such behaviors could be relatively simple and direct" (McKnight, 1979, p. 11). Perlberg (1972) supported both views above and saw the micro context as being based "on long-established learning theory which today underlies programmed learning and computer assisted instructions. It is assumed that learning is more effective if a complex skill is divided into its components and learned step by step before it is undertaken as a whole" (p. 555). He qualified this by indicating that observational learning and "Other concepts of learning theory such as feedback, reinforcement, or extinction were also adopted" (p. 556).

This last point leads to the fourth conceptual framework associated with the Stanford programmes, namely, behaviour modification. The leading advocate of this model was McDonald. McDonald (1973) saw microteaching as a programme within teacher education which "may be conceptualized as behavior modification systems designed to modify complex behavioral repertoires which are adaptable to a variety of learning problems" (p. 41). He then complained that a weakness of many studies is that while they have the "aura of behavior modification about them... behavioral analysis has *not* been made of the dependent variables" (pp. 58-59) and the "reinforcement contingencies are not precisely defined" (p. 59).

Whilst many researchers (e.g., Meier, 1968; Manis, 1973) accepted the behaviour modification model, few seemed to wish to apply basic behaviouristic principles to their training programmes. McAleese (1973), for example, summarised such sentiments when he suggested that "the microteaching approach is a behaviouristic one, and is, of course, open to all the criticisms which can be attributed to this Skinnerian approach. This should not, however, stop research into the shaping of novice teaching behaviour in the microteaching environment" (p. 136). St John-Brooks and Spelman (1973) also took issue with the behaviouristic approach and saw that "With the mention of 'shaping' desirable behaviour through 'successive approximations' to a model, we are in a controversial area. Most of the criticism of microteaching is levelled at this procedure and its implications" (p. 17). They saw that as a consequence of this theoretical

framework there was a "threat to the integrity and individuality of the student teacher, who must conform to a standardised model" (p. 19).

MacLeod and McIntyre (1977) were also not in favour of a behaviouristic rationale for microteaching but they warned that "critiques of such a rationale for microteaching must be rather less simplistic in their caricatures of behaviour modification theory" (p. 255). The reason for this was that the work of McDonald, with its strong behaviouristic approach, also relied on "principles derived from Bandura's (1971) social learning theory, which itself allows ample use of quasi-cognitive constructs" (p. 255).

It would appear that many practitioners accepted that "microteaching derives its main impetus from behaviourist theories such as task analysis and Skinnerian patterns of operant conditioning" (Spelman and St John-Brooks, 1972, p. 88). It would also seem that McDonald (1973) was correct when he stated that "Many users of microteaching apparently did not see the relevance of behavior modification principles" (p. 72), and that "the role of behavior modification in training was obscured" (p. 73). However, at the same time, it would seem that those involved in microteaching did not view the lack of attention to behaviour modification principles as a "most undesirable consequence" (p. 73).

Social Skills Model

A further theoretical framework is one derived from the social skills training model of Argyle (1970). This approach assumed that teaching is a set of social skills and that social skills are closely related to psycho-motor skills. The model suggested that relevant aspects of the programme should relate to the perception of relevant cases (through some form of modelling), practice of the skill and feedback.

Brown (1975a) applied Argyle's theory to the microteaching technique. To test this model, and whether teaching skills could be considered as social skills, he suggested "that practice with feedback should change performance and the pattern of scores obtained in

microteaching should not be dissimilar from skill learning curves" (p. 79). Brown concluded that the results showed a "pattern...not dissimilar to that of a skill curve" (p. 80) and he "tentatively" concluded "that the pattern of scores gives some support to the view that teaching is a set of social skills which is learnt" (p. 80).

Implicit in both the social skills training model above and the four models derived from the Stanford programme is the importance of the role of practice. It is this aspect above all others which distinguishes these models from those with a cognitive perspective.

Cognitive Models

Cognitive models place emphasis on the trainees' interpretations of what occurs within a microteaching programme. That is, they "place greater emphasis on participants' thinking about their teaching" (MacLeod, 1981a, p. 2). Works that encompassed this perspective include those of Fuller and Manning (1973), Bierschenk (1974) and MacLeod and McIntyre (1977).

Fuller and Manning (1973), in a lengthy review of studies outside education, focused on some of the complexities of the processes and effects of self-viewing. They referred to this as self-confrontation. As a result of their review, they identified three different views of behavioural change, namely, "self-theory or an experiential view, learning theory or behavior modification view and attribution theory" (p. 505). They further suggested that these views were not "antithetical but rather complementary" (p. 505). MacLeod (1975) expressed reservations about the conclusions reached by Fuller and Manning. However, he was in agreement with the increase in attention given to cognitive variables and the move away from behaviouristic views. Finlayson (1975) also welcomed the move to a cognitive perspective but argued that Fuller and Manning may not have gone far enough.

Bierschenk (1974) also took a cognitive view of the learning processes involved in microteaching. His approach, which was partly based

on the TOTE model (Miller, Galanter and Pribram, 1970), dealt with information-processing. The basic principle underlying the model was that "behavior modifications pre-suppose a structural change in the individual's field of perception and his structures of values and beliefs" (p. 14).

There are several similarities relating to the role of motivation in the learner between the above two conceptualisations; however, "an important difference lies in the role assigned to incongruity or imbalance of cognitive structure" (MacLeod, 1976, p. 37).

The model proposed by MacLeod and McIntyre (1977) and formulated in the context of the work carried out at Stirling focused less on motivational aspects than the previous two models. This model suggested that teaching skills should be considered as "ways of thinking" rather than as "ways of behaving". The model they proposed has the following seven characteristics:

(1) Before entering microteaching programmes, each student has distinctive, complex conceptual schemata relating to teaching, these schemata having strong evaluative associations.
(2) Individual differences in these conceptual schemata are large, but large areas of commonality may also obtain, through the embedding of the schemata within (*inter alia*) a network of schemata representing specific subject ideologies.
(3) These conceptual schemata show a high degree of stability, but can change gradually through the assimilation of new constructs and principles, acquired through instruction and experience.
(4) Students' conceptual schemata to a large extent control their teaching behaviour, and changes in behaviour result from changes in schemata.
(5) New concepts and ways of perceiving teaching are acquired largely as a result of instruction, but new principles and ways of evaluating teaching are acquired not only from instruction but also from students' perceptions of what actually occurs in their microteaching lessons; and where these two influences conflict, it is the latter which predominates.
(6) Since the constructs in terms of which students will perceive their lessons are largely determined before they teach the lessons, the kinds of mechanical or descriptive feedback with which they are provided will have only little influence on the nature of their perceptions or therefore on their subsequent teaching behaviour.

(7) Since students' explanations of the effects of teaching behaviours, and consequently their evaluations of it, are influenced by what happens in their lessons, the interpretations and judgements of others on lessons they have taught, and the alternatives they offer, are potentially influential factors in students' learning.

(pp. 260-261)

Griffiths (1977) believed that this model provided a new way of viewing the processes of learning involved in microteaching. He expanded on this by explaining how three aspects of microteaching, namely, skill definition, modelling and feedback, may be viewed within this cognitive framework. For example, skill definition was not seen as "simply response analysis involving description of teaching behaviours in observable terms,...[but rather] in terms of manageable concepts which teachers can use in processing, classifying and interrelating the information which arises from the complexity of classroom interaction" (p. 195). Further, modelling was not seen as excerpts of teaching behaviour to be replicated but "as a means of providing exemplification of the constructs included in the skill definition" (p. 195). Finally, feedback was not seen as a method of reinforcement of a behaviour but "as providing information which the teacher can rationally process and relate to his existing conceptual schemata of teaching" (pp. 195-196).

This section has briefly discussed several frameworks which are believed to underpin the processes of skill acquisition in microteaching. It would appear, though, that the majority of educators and researchers have ignored the existence of such models and, as a possible consequence, much of the research carried out into microteaching has not been enlightening.

While many similarities exist between the models proposed above, one major difference that emerged was the importance attached to the value of or need for practice. The early models based on the Stanford programmes and the social skills model of Argyle all saw practice as having a crucial role in skill acquisition. On the other hand, to varying extents, the cognitive models discussed did not see practice as so important. In

particular the model proposed by MacLeod and McIntyre questioned the value of practice in skill acquisition. This model also appears more consistent with trends emerging from the literature which emphasised the importance of the components of modelling and discrimination training in the process of skill acquisition. The model proposed by MacLeod and McIntyre (1977) saw the role of microteaching as being

> a means of producing changes in one's cognitive activities while teaching, changes in the ways one construes the courses of action open to one and the effects of one's actions, with its prescribed role being to provide for the development and induction of functional and adaptive cognitive structures.
>
> (p. 262)

This model received support from Batten (1978), Hargie (1982) and in a more general way from Bandura (1977), and studies into teachers' thinking about teaching (e.g., Shavelson and Stern, 1981). Griffiths (1977), in particular, saw great promise in the model proposed by MacLeod and McIntyre and he stated

> Perhaps now we can express a new hope for the future of microteaching: that the emergence of a more adequate conceptual framework will help us to achieve greater impact than hitherto in the research, development and application of microteaching in teacher education...[and] help us build that elusive bridge between theory and practice in the training we give our teachers.
>
> (p. 196)

SUMMARY AND CONCLUSIONS

The major findings that emerge from discussion of the historical development of microteaching are that, despite unprecedented growth in the use of the technique, evidence as to the greater effectiveness of microteaching over alternative programmes has not been substantiated. In addition, despite a large number of research studies, little is really known or can be concluded about the elements within microteaching.

One reason suggested for this lack of conclusive evidence concerning microteaching was due to the often trivial nature of research questions asked. While many studies had elaborate designs, "sophisticated methodology is worthless when the research question is imprecise or irrelevant" (Hansford and Copeland, 1979, p. 70). Even "the attainment of statistically significant results may itself be of little practical or theoretical significance" (MacLeod, 1981c, p. 40). Associated with these comments was the realisation that the large majority of research articles published on microteaching were more concerned with what might be referred to as pragmatic or programmatic questions. While these studies may have satisfied some short-term goals they added little to our knowledge of how people acquire teaching skills. It is apparent that research into microteaching will be most useful if it attempts to answer questions which relate to some framework or model.

The review undertaken in this chapter has discussed several models which were believed to underpin the learning processes in microteaching. Out of this review a change in the rationale for microteaching could be discerned from the models associated with the early programmes at Stanford. The change arose through "the emergence of a cognitive perspective" (Griffiths, 1977) on the learning that takes place in microteaching. The advocates of this perspective have distanced themselves from the predominantly behaviouristically orientated framework which surreptitiously or explicitly dominated the past. This cognitive perspective assumed that for behavioural change to take place the students needed to incorporate, in some form, the skill concepts into their perceptual or cognitive repertoire.

Three cognitive models were discussed, and the model proposed by MacLeod and McIntyre "encourages a different perspective on skill definition, modelling and feedback" (Griffiths, 1977, p. 195) and perhaps best describes some of the more recent findings of research. Most notably, this model allows interpretation of the data which suggested the possible importance of discrimination training in skill acquisition.

Discrimination training, which is sometimes present in skill acquisition programmes, was viewed by several investigators as a potentially critical component in skill acquisition. Some researchers believed it was this component that, when present, accounted for the equivalent results achieved by differing treatments. In addition, they believed that this component may help reinterpret the results achieved in several past studies.

However, while the research evidence detailed earlier was generally positive about the benefits of discrimination training, only a few studies attempted to investigate this aspect. Also, several factors were identified within these studies which precluded outright acceptance of its critical role. These factors were often related to deficiencies in the design of the studies. They included: small numbers of students; inadequate background information for some competing treatment groups; inappropriate measuring instruments; different time allocations for competing treatment groups; reliance on a single skill; and failure to consider students' reactions and attitudes. Whilst all these problems did not occur in each study, their general prevalence was sufficient to at least question some of the stated findings.

The possibility of this critical nature of discrimination training also gives rise to questions about the effect or role of practice in skill acquisition. However, "The fact is that the data are too limited to make confident statements about the effect of practice by itself on performance" (Gliessman, 1981, p. 8). Reasons for this lack of research probably are related to the accepted belief that "practice makes perfect". Yet, at the same time, recent surveys indicated that the majority of institutions never use the reteach component. One reason that the reteach is not used appears to be that only minimal changes in performance are noticed in subsequent practice sessions. However, this conflict between the perceived and the received uses of practice has gone unresolved. Not only does the literature fail to show that practice is sufficient, it fails to demonstrate that it is necessary.

There are two approaches in which the role or effect of practice can be considered. One is to compare the performance of students who do not practise with students whodo, and the second is to consider the effects of repeated practice. Several studies, although not directly considering practice, had designs which incorporated one or both of these basic approaches and these have been discussed. However, the problems outlined above that limit our understanding of the role or value of discrimination training also apply to the role or value of practice and allow for competing interpretations to emerge.

The answers to questions which examine the value or role of practice and discrimination training lie at the very heart of the model proposed by MacLeod and McIntyre. Any study which investigates the role or effect of practice should use discrimination training as an alternative treatment, and together they will in turn give insight into the possible value of the given model for skill acquisition. In particular, such a study could provide information about the value and effects of practice and discrimination training and help determine whether it is appropriate to suggest a cognitive framework in which to view the process of skill acquisition.

Support for an investigation of practice and discrimination training can be found in the literature. Although Gliessman (1981) has suggested that "An attempt to isolate the effect of practice..., may not be highly useful" (p. 8) because, in part, "a large body of empirical research on the acquisition of complex skills [outside of the field of education]... verifies the effect of focused or guided practice in skill development" (p. 8), this view was not held by several other investigators. Batten (1978), for example, saw as a limitation to his study that it did "not provide enough evidence to comment separately on the contribution of discrimination training in association with, or apart from, microteaching practice" (p. 417). Malley and Clift (1980) suggested that there is a need for a study which compares treatment groups that undertake discrimination training only, microteaching practice only, and discrimination training and microteaching practice, as "no one has yet experimented with a conclusive design to demonstrate the superiority of discrimination training as either

a stand alone training method or a complementary method to the micro-teaching technique" (pp. 170-171). Hargie (1982) claimed that "The task now facing researchers is to evaluate specific elements of microteaching, such as the use of various modelling processes during discrimination training in teaching skills, ...and their effects on the behaviour, attitudes and cognitive processes of trainees" (p. 81).

In planning such a study, steps should be taken to remove or at least minimise the design deficiencies in related studies that have been identified previously in this chapter. In addition, "considerable attention [should be given] to individual differences among students, to the nature of the particular skills being practised, and to differences among subject ideologies" (MacLeod and McIntyre, 1977, p. 258). Batten (1978) supported these comments and suggested that although his "study did not differentiate students by teaching-subject groupings nor did it attempt to gather data across a range of skill areas...further research in these aspects would be worthwhile" (p. 414).

While large numbers of students within a study may help minimise the effect of individual differences, few studies considered either the nature of particular skills or differences among subject ideologies. Though some studies considered different skills (e.g., MacLeod *et al.*, 1977 used three skills), the majority of studies relied on only one skill. No study has sought to compare results across different skills, although Gliessman and his associates (1979b) suggested there may be possible differential effects if skills were placed on a verbal-non verbal dimension. While the literature does not give a definite lead in this respect it would seem that a cognitive-behavioural dimension may be more illuminating. Consideration of subject ideologies has been largely neglected in the research literature. However, the model of MacLeod and McIntyre hypothesized large areas of commonality in students' behaviour based on the grouping of students in terms of specific subject ideologies.

Finally, in addition to the above, there is a need to consider the reactions or attitudes of students to differing treatments. While much has been written about the overall general positive reaction of students to a

traditional microteaching format, no equivalent information is available with respect to discrimination training.

RESEARCH QUESTIONS, HYPOTHESES AND THEMES

From the issues in the literature and in the light of the tentative conclusions reached, a series of questions arose which seemed not only open to, but worthy of, empirical investigation.

In their most general form these questions are:

a) What is the effect of practice on the acquisition of teaching skills?
b) Is discrimination training as effective as practice for the acquisition of teaching skills?
c) Will students' attitudes to microteaching be the same for practice sessions as for discrimination training sessions?
d) Does the grouping of students in terms of subject ideologies serve to differentiate performance?
e) Do the answers to the above questions remain the same if the nature of the skill practised is changed (i.e., from a cognitive orientation to a behavioural orientation)?

From these questions it was possible to formulate four null hypotheses and these are presented below.

H1: There will be no differences in performance between those students who have practised a teaching skill in a microteaching session when compared with students who have undertaken discrimination training (but no practice).

This hypothesis will be tested in relation to a skill with

a) a behavioural orientation,
b) a cognitive orientation.

H2: There will be no differences in attitudinal responses between those students who have participated in a traditional microteaching session (including teach, replay and feedback) when compared with students who have undertaken a discrimination training session.

This hypothesis will be tested in relation to a skill with

a) a behavioural orientation,

b) a cognitive orientation.

H3: There will be no differences for students in their performance in a microteaching lesson when compared with their performance on a further microteaching lesson (a reteach lesson).

This hypothesis will be tested in relation to a skill with

a) a behavioural orientation,

b) a cognitive orientation.

H4: There will be no differences in attitudinal responses given by students regarding a microteaching session when compared with their responses regarding a further microteaching session (a reteach session).

This hypothesis will be tested in relation to a skill with

a) a behavioural orientation,

b) a cognitive orientation.

Several additional research questions also emerged from the literature review concerning the effects of practice and discrimination training. While these questions are secondary in nature to those previously identified, data relevant to these questions can further clarify the role of practice. Further, both the data and the possible answers to these questions can contribute to a better understanding of the results related to the major research questions.

The questions are

a) How do scores on a concept acquisition test obtained by students who have been trained in skill identification (i.e., undertaken discrimination training) compare with those students who have participated in a microteaching session but have not received specific training in skill identification? Does the grouping of students in terms of teaching subject area differentiate between test scores? Does the effect of the skill orientation (i.e., behavioural or cognitive) alter the results?

b) How do the scores achieved on a concept acquisition test relate to performance? That is, are performance and concept mastery (as assessed by a concept acquisition test) related? Does the effect of the skill orientation alter the results?

Each of these two themes is of intrinsic value and interest and also has the potential to further clarify the effect of practice and discrimination training. The questions posed, however, are more concerned with illuminating an under-researched area than with the direct testing of hypotheses. Because of this, no specific hypothesis related to these questions will be posed but rather each theme will be addressed separately.

In developing the research design, several considerations were identified from the review of literature and by the demands implicit in the hypotheses and themes. Among these was that the study should take place in a situation which was as closely allied to a normal microteaching programme as possible, a consequence of this being that the skills chosen as the dependent variables in the study should be selected from those skills which are recognised as the most commonly used skills in training institutions. Also, the assessing of students' attitudes towards various sessions and their extent of concept acquisition should not unduly interfere with the ongoing microteaching programme. Thus, in choosing various measuring instruments, a criterion to be applied would be that the administration of these instruments should not take too much time. The following chapter considers design aspects of the study in detail.