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ABSTRACT

Microteaching as developed at Stanford University has received much attention from educators, but the model has not been adapted in many institutions due to the cost and time involved. To help professionals evaluatemicroteaching at their institutions, this paper looks at the rationale and effectiveness of the full model as developed at Stanford and at its adaptions. An attempt is made to determine optimal models for specific instructional needs. (Author)

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Microteaching: Variations of the Model

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Microteaching has been one of educator's more modern techniques for training teachers. A general description of this new technique may be had by looking to Stanford University, where the idea of microteaching originated. During the first experiments, graduate students spent an entire summer in a microteaching situation carefully controlled to help them develop teaching skills. In this summer clinic, each student micro-taught approximately twenty times (Fortune, Cooper, and Allen, 1965). Specific skills were emphasized for the first six microteaching cycles, but students were also involved in "team teaching". A cycle of teach-feedback-reteach was developed for each microlesson. After the system had been practiced and revised for several years, Allen and Ryan (1969) published a description of the model.

Today the model has been adapted in numerous ways to the varying needs of educational institutions. The purpose of this article is to look at the adaptations and determine whether they are worth the time and effort involved and whether there is a "most effective" way of implementing micro-teaching.

Ward (1968) surveyed NCATE-accredited institutions to determine what adaptations of the model they had made. His study indicated that 66 percent of the responding institutions involved less than 150 students in microteaching and used less than 6 microteaching encounters per pupil.

In most institutions students taught peers rather than high school or elementary school students, and most also used less than 6 pupils per microclass. Less than one-third of the institutions had a written rationale or video-tapes or filmed models of any of the technical skills to be learned in microteaching. Some institutions skipped the reteach and critique parts of the model and others used them only occasionally. Video tapes were used by 59 percent of the institutions more than 75 percent of the time. Most institutions viewed microteaching as both a good affective and learning tool.

OVERALL EFFECT OF MICROTEACHING

In the basic (Stanford) microteaching model, approximately an hour is spent for each student (15 minutes for the teach, 15 minutes for the reteach, and approximately 30 minutes for preparing and giving a critique). Thus, if a class of thirty students is involved in one microteaching cycle, the supervisor (usually the professor of the class) must spend thirty hours on just the fundamentals of microteaching.

The worth of this time spent on the part of the student and supervisor can be assessed by examining the results of microteaching. Two such studies, by Kallenbach (1967) and Lockhart (1968), indicate that microteaching can successfully be used as part of the student teaching experience or as the whole experience. Both types of training result in equal performance. Unfortunately the Lockhart (1968) study was done on a very small sample of 16. Nevertheless, there are replications which

support the idea that extended microteaching may be useful as a replacement for student teaching. Since microteaching could save many universities and colleges much time and money, more research needs to be done on the effectiveness of student teaching and microteaching in an absolute sense.

Of the studies conducted to assess the effectiveness of limited microteaching, little conclusive evidence can be drawn from the data. Limbacher (1971) and Gall, Dell, Dunning, and Galassi (1971) found some significant differences between students who had participated in microteaching and those who had not. However, in both studies only those who signed up for the course or lab were used in the experimental group while those who had not signed up were used as controls. The differences found may be due to the microteaching, but there also a definite possibility that the more interested and better teachers signed up for the course and the more apathetic ones did not, thus causing the differences. The Gall, Dell, Dunning, and Galassi (1971) study also dealt with in-service teachers, which may be a completely different population than college students.

Another study (Goodkind, 1968) also found a general improvement in teacher performance after microteaching. In this study, the microteaching occurred during student teaching and all subjects taught the same lesson. However, some received video-taped feedback and a critique of the lesson along with an opportunity to reteach the lesson while the control group did

not. Because of problems in data gathering, no significant differences were observed. Non-significant differences were observed, however, among them being "greater affection for students". The question arises why feedback and a reteach session would lead to differences in affection for students, and this is not explained in the study.

The Harris, Lee, and Pigge (1970) study provided some supporting evidence for the effectiveness of microteaching. Students who had micro-taught six times to small groups of peers during the semester rather than one time to a large group did significantly better on classroom techniques (i.e. overall ability to provide background information, responding well to peers, and letting students develop their own conclusions. But whether the number of microteaching situations or the microteaching conditions made the difference is difficult to say. The better group taught only five students, with a graduate student as well as instructors possibly offering comments, while the other group taught 36 students.

There are also studies which show negative results for microteaching. Friebel and Kallenbach (1969) tested a minicourse developed by the Far West Laboratory for Educational Research and Development. They found no difference in groups receiving the entire minicourse and those receiving the minicourse without microteaching and without a video tape of the lesson. Unfortunately, students were not randomly assigned to treatments and, although an analysis of covariance was performed on the data, the results

may be due to differing abilities between groups rather than to a lack of effect of microteaching.

Brashear and Davis (1970) observed student teachers who had or had not participated in microteaching previously. In all, there were no definite significant differences in performance favoring the students who had microtaught and in attitude, students who had not microtaught had more positive attitudes than those who had. The use of an analysis of covariance on the performance data may account for the lack of significant differences. The analysis could have erased any initial difference between groups which might have been the result of the microteaching, and there is no real reason to expect the students to improve at different levels once they are no longer microteaching. In four out of twenty-two attitude measures, the subjects who had microtaught were lower than those who had not. This may be due to chance because of the large number of ratings analyzed or it may be, as the experimenters suggest, that the former microteachers were expressing the negative attitudes common to first year teachers even though they were only student teaching.

The data, then, are not clearcut as to the overall effect of the full model of microteaching. Perhaps the use of evaluation sheets which are not exceptionally valid or reliable accounts for part of the trouble. But a proficient way of measuring the effect of microteaching will not be established until a purpose for microteaching is established along with

criterion evaluations. When this kind of measure is developed, the effectiveness of microteaching can be evaluated by observing the number of points each subject changes due to microteaching (or repeated microteaching) and determining the average change per group that microteaches and group that does not. This would avoid the current trend of present rating scales to record "significant" changes even though no one has any real idea of how great these differences are, since they depend on the size of the group used in the experiment and the variance of the group. In criterion measures, significance is not the important thing. Rather, the important consideration is whether groups can reach criterion or not. If all groups or individuals can reach criterion, then we may assume that no "significant" differences exist among the treatments. An initial attempt at creating a criterion scale for microteaching was made by Rosine, Hiscox, and Van Mondfrans (1972). The guidelines used in setting up this scale may help in the development of criterion rating scales for several skills currently taught through microteaching.

A number of points on a criterion scale might be established to determine whether or not the effects of microteaching are worthy of the time spent on it. If microteaching does not help students acquire teaching skills, but is still desirable as a practice situation then it may be more feasible to have each student microteach to a small group of peers without bothering with a model, video tape of the lesson, critique, or reteach session.

MODELING

Of the many known ways of increasing microteaching efficiency, one of the first worth examining is modeling. The research so far seems to indicate, at least superficially, that some sort of model of teaching skills does produce positive results.

One study comparing the effectiveness of a model versus no model was done by Chavers, Van Mondfrans, and Feldhusen (1970). They compared the performance of groups that either did or did not receive (1) a model of the skill they were to teach, (2) sensitivity lectures, and (3) opportunities to microteach. They found differences only between one set of groups that differed only as to whether they had or had not received lectures on the Stanford skills (modeling). However, there were four sets of groups which varied only on the modeling factor and none of the other three sets were significantly different from each other. These results lead to the conclusion that there are more important factors in the microteaching model than modeling.

Orme (1970) found that students who rated other students on their microteaching performed better on their own microteaching than did a control group. If one can argue that watching microteaching is essentially the same as watching a model, this may show that modeling is effective in microteaching. On the other hand, rating someone who is microteaching calls for active participation on the part of an observer, whereas watching

a model is a passive activity--and the active participation may have accounted for the differences rather than the passive observance of the model.

White (1963) used an audio tape and written transcript as a model for teaching indirect verbal behavior. On the basis of a Flanders Interaction Analysis, he found that the experimental group, which went over the model four times, did significantly better than the control group, which did not go over the model at all. While White (1968) indicates that a verbal model may be useful for teaching a verbal skill, no one has really shown that a video tape model (the type that is usually used) has any real effect on the skill of microteachers. A simple experiment comparing different types of models against a control group which receives no model seems to be in order before modeling can be accepted as a basic part of microteaching.

If, however, one accepts the idea that modeling does add to microteaching, then the next step is to determine whether perceptual or symbolic and pure or mixed models are best and what types of focuses are best.

The problem of whether a perceptual or symbolic model is most efficient was researched by Allen, Berliner, McDonald, and Sobol (1967). They found no difference between a video taped (perceptual) model and a written (symbolic) transcript of the same model. The experimenters concluded that the lack of significant differences might be due to the fact that a verbal skill was being taught. Young (1969), however, also found no significant differences between subjects receiving a perceptual and

symbolic or symbolic only model. Since Young focused on both verbal and psychomotor skills, it may be that a symbolic model is as effective as a perceptual model in many instances, given that all other conditions are held constant.

McDonald and Allen (1967) studied the effects of perceptual versus symbolic models under differing feedback conditions. They discovered that a combination of both types of model with an experimenter's comments on the perceptual model and feedback on a video tape of the subject's performance resulted in a significantly greater increase in probing skills than did the symbolic model and no feedback. There were, however, no other groups which received either a perceptual model alone or a symbolic model alone and the same type of feedback on the video tape. This makes it very difficult to interpret whether the results were due to the feedback or the models.

Young (1968) also found that a model with a contingent focus (an audio or video statement added to the model to draw attention to pertinent behavior) with specific illustrations was the best type of model. This tends to support the results of the McDonald and Allen (1967) study in which prompting on the model proved an important variable.

Another question posed by Allen, Berliner, McDonald, and Sobol (1967) was whether a pure model--exhibiting only the desired behavior--or a mixed model--exhibiting both desired and undesired behavior--was

most efficient. The experimenters found that a pure model helped in transfer to a new lesson. The two most effective procedures found were first, a mixture of a pure perceptual model with the subject reproducing the model lesson exactly and, second, a symbolic mixed model with the subject writing his own lesson. Since most schools tend to let students use their own lessons, the second form of modeling is probably the most useful. It must be noted, however, that a purely verbal skill was micro-taught. More experiments should be conducted to determine which type of model is most appropriate for other skills.

The whole area of modeling needs more research. Young (1968) found that a model out of context was better than one in the whole context, indicating that the less extraneous material in the model, the better. But more investigation would help clarify his findings. The idea of contrasting good and bad models--good and bad examples of the same behavior in the same situation--deserves inquiry. Perhaps combinations of pictures and audio-taped comments could be employed. Student activities which would make models more effective, such as rating the models, should be determined.

And finally, more work of the type done by Koran (1968) on student-focused microteaching models should be completed. While Koran found that student focus in the model was better for the stimulation of problem-solving behavior, he lacked sufficient subjects to show significant

differences or allow for any interpretation of the lack of significance. His work, however, is worthy of further investigation.

FEEDBACK

In addition to forms of modeling, forms of feedback must be considered. In fact, does feedback in any form add to the microteaching model? A study by Morse, Marcella, and Davis (1970) investigated the differential effects of no feedback, listening to an audio tape of the lesson, listening to an audio tape with the aid of a listening guide, and listening to an audio tape of the lesson with non-directive supervisor feedback. The results show no differences between groups on either student ratings, peer ratings, or observer ratings. However, significant differences were found on the number of refocusing behaviors implemented (the skill being learned). The difference favored the group which listened to the audio tape with a supervisor conference.

Since, however, the ratings were originally the criteria, what does it mean to have a significant difference in the number of refocusing behaviors? It may mean that refocusing is not an important aspect of teaching; on the other hand, it may point to the need of establishing criterion rating scales. Without a scale, differences are hard to interpret. The significance may be due to the number of statistical tests made, or to the supervisory critique.

Hiscox, Rosine, and Van Mondfrans (1972) also assessed the importance of a critique. They found a significant difference between subjects who received a critique and those who did not on the amount of change from the teach to reteach session. For this experiment, a twelve point rating scale based on demonstration techniques was used to assess microteacher performance. The critique was based on questions made up from the rating scale and was given in conjunction with a video tape of the subject's teach session. Thus, the two studies discussed thus far seem to indicate that a critique is potentially beneficial to a microteacher.

But even though some critiques may be useful, the following areas need to be investigated to determine what makes a critique effective: (1) who should give the feedback, (2) what aids should be used in the critique, (3) who the feedback should focus on--microteacher or student reactions, (4) the usefulness of remote supervision for in-service training, and (5) the best types of questions and remarks to use in a critique.

The first question to consider is who should give the critique. Several people are available--the microteacher himself, a supervisor, micro-students, and other microteachers. As had already been mentioned, Morse, Marcella, and Davis (1970) found that when an audio tape was used a supervisor conference led to more improvement of the desired teaching skill than did different forms of self-feedback. There were, however, no differences between the self-feedback conditions and a no

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at the Columbus Technical Institute--which may make them a different population from the pre-service students who usually participate in microteaching. In the Doty study, the self-critique involved using a video recorded instructional model and some form of self-evaluation. Johnston (1969) also found no differences between students who received self-feedback and those who received supervisory feedback. However, since microteachers analyzed video tapes of the lessons using the Flanders Interaction Analysis, they may have paid more attention to relevant aspects of the lesson than would students who were not forced to evaluate their own lesson. The same results are suggested in a study by Birch (1969) in which self-coding was found to be more important than whether or not the subject received a video tape of his performance and whether or not he coded video tapes of other microteachers' performances.

One way to interpret the conflicting results of the studies on self-critique versus supervisor critique is to consider the attention factor. In the studies which showed no difference between supervisor and self-critiques, the subject was either forced to use some self-coding or to observe models in conjunction with observing or listening to a tape of his own lesson. This may have forced him to think about his lesson much more than simply giving him listening guides or general topics to consider. There is no way to gauge attention when microteachers are given just a guide.

Another possible interpretation of the conflicting results depends upon how the supervisory feedback was implemented in each study. If, as in the Stanford model (McDonald, Allen, and Ryan, 1966), supervisors used selected portions of the tape as a basis for the feedback in one study, and in another study the supervisors showed the whole video tape and made general comments then supervisory feedback of the latter type should not be as effective as the former and would lead to an under-estimate of the effect of a supervisory critique.

Johnston (1969) found that self-supervision using Flanders Interaction Analysis led to more indirect teaching (the emphasized skill) and higher scores on the Minnesota Teacher Attitude Inventory, while the supervisory treatment--which was a thirty minute conference after the supervisor watched the live lesson--promoted a significant relationship between attitudes and teaching behavior. In this case, the self-supervision may have focused much more on the critical aspects of the teaching skill than did the supervisor critique. Since indirect teaching was supposed to be the important part of the microteaching lesson, it would seem that self-supervision is preferable to a supervisory critique. But again, self-evaluation sheets need to be made up and validated for the many other microteaching skills.

Two studies have also been conducted as to whether student critiques or colleague critiques are useful. Harrington (1969) found no significant

differences among groups using self critiques, student critiques, fellow instructor critiques, and teacher educator critiques. He did find, however, a significant negative attitude on the part of microteachers receiving fellow instructor critiques. Young (1970) did not study attitudes, but found that colleague supervision was superior to supervisor critiques for orientation skills and some other verbal and non-verbal skills. If, as Harrington found, colleague supervision results in a negative attitude, it should be ruled out as a form of feedback. However, further studies should be made. The Harrington subjects were in-service technical education teachers whereas the Young subjects were in a Master of Arts teaching program and may have had more expertise in giving critiques. The method of implementing the critique was also carefully spelled out for the microteachers in the Young (1970) study. Another factor to consider is that in the Young study, the subjects and critiques might have known each other while in the in-service program it is more likely that strangers were critiquing one another. But again, there is no empirical evidence for the best method of implementing a colleague supervision program or what the advantages and disadvantages of such a program might be. Certainly the questions of how much the lesson should be structured, what the critiquers need to know to be effective, and what determines a positive attitude towards critiques are important.

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(2) the subjects met with the teacher educator in a face-to-face conference using a video tape of the lesson, (3) there was a three day delay between the teach and feedback sessions (which were face-to-face conferences) and a video tape of the lesson was used, and (4) there was a remote supervision via a video tape replay of the teacher's lesson and and audio playback of the teacher educator's critique. All groups changed significantly from the teach to the final teach session, but there were no significant differences among groups. The remotely-supervised teachers expressed a desire for one personal contact with the supervisor. But the time lag and its interaction with the video tape were not isolated for study. More research must be done to determine the effects of aid-time lag interaction.

Unfortunately very little research indicates that feedback serves any useful function at all in the microteaching model. However, all studies involving rating scales are subject to question as to how much information they really provide. None of the following studies set up a "criterion" performance and all use rating scales of one type or another, so that interpretation of the results is disputable.

Shively, Van Mondfrans, and Reed (1970) found that microteacher performance was most affected by a supervisory critique based on either an audio tape or student ratings of the lesson. Subjects were least affected by a critique based on the supervisor's observation of the live

lesson. A critique based on a video tape of the lesson was neither best nor worst. However, when student attitudes were assessed, the groups receiving a critique based on the video tapes and audio tapes were superior to the other two groups. This may indicate that an optimum combination for affect and performance would be a critique based on an audio tape of the lesson.

Gall, Dell, Dunning and Galassi (1971) investigated the effect of a critique based either on an audio or video tape in improving teacher's mathematics tutoring skills. They found the video tape better in producing improved demonstration techniques, the audio tape better in evaluation practices, and both audio and video tape equal in the number of demonstration techniques used and the amount of practice provided. The experimenters concluded that there was no significant difference between audio and video tape feedback. Boone and Stech (1970), in a study on developing clinical skills in speech pathology, also found that audio tape equalled video tape.

Smith (1969) compared supervisory critiques of student teachers in the following conditions: face-to-face critiques, phone critiques based on audio tapes of the lesson, and phone critiques based on video tapes of the lesson. The experimenters found no significant differences among the treatments in performance or confidence level of the teachers, although the student teachers and their supervising teachers were less satisfied

with the audio tape treatment than with either of the other two. The college supervisors, however, showed no preference for one methor over another although the phone treatments required less time for each contact. If a microteaching format is to be followed in directing student teachers, the poor effect resulting from the audio tape must be overcome if audio tape is to effectively be used.

Most of the studies comparing audio and video tapes have emphasized verbal skills. Neither of the experiments involving some psychomotor skill (Smith, 1969 and Gall, Dell, Dunning and Galassi, 1971) reported any type of interaction between type of skill and type of tape used for feedback. Hiscox and Van Mondfrans (1972), however, used microteaching for the development of four skills to look at a possible interaction. Two of the skills were verbal and two were psychomotor. On the basis of student ratings of the microteachers, the audio tape group performed significantly better than the video tape group for the verbal skill of developing student initiated questions, but audio and video tape were not significantly different for the other three skills. These results support the findings of the other studies--audio and video tape are equally effective for critiquing microteaching lessons regardless of the type of skill being emphasized.

TYPE OF STUDENT

Another point to consider in developing and implementing a microteaching model is the type of student used in the microclass. At Stanford, high

school students are used in the microclasses for future high school teachers (Allen and Ryan, 1969), while at other institutions such as Brigham Young University and the University of Texas at Austin, peers are used. The people at these institutions cite financial, transportation, and scheduling difficulties as reasons for using peers (Belt and Baird, 1967; David and Smoot, 1969). Although studies comparing the results of teaching peers and high school students (c.f. Hoerner, 1969; Brown, 1968; and Collofello, Henrie and Whitefore, undated) have uncovered no significant differences in microteachers' performances, these studies have several problems which make the data difficult to interpret. In the Hoerner (1969) and Brown (1968) experiments, a lack of difference in performance between the two groups may simply indicate that the subjects teaching peers learned how to teach peers just as well as the subjects teaching high school students learned to teach high school students. Unless it can be demonstrated that the skills learned were the same regardless of the microclass students, one can draw no meaningful conclusions from the two studies.

Collofello, Henrie, and Whiteford (undated) avoided the pitfall of the other studies by giving the subjects both a pre- and post-microteaching experience involving high school students. Tapes of the pre- and post-lessons were used to determine how much the subjects had changed. Although the pretest accounted for entering skills, it may also have given the micro-teachers experience in instructing high school students at least once before

the posttest, thus coloring any conclusions about transfer of skills from peer teaching to high school teaching. A study needs to be conducted comparing the effect of microteaching to both peers and public school children where no other effects contaminate the data. It may be possible to add a third condition in which students teach peers and reteach public school students, if regular peer teaching should prove inefficient. In a study of this kind, the type of feedback might be important--concerning what type of suggestions are made or questions are asked and their relevance to the type of student the microteacher will be teaching on the posttest.

TYPES OF FEEDBACK QUESTIONS USED

The type of feedback questions used may have an important bearing on the effectiveness of the critique. Allen and Ryan (1969) state that they use mainly reinforcing feedback, thus rewarding good behaviors and hoping the undesired ones will die out. Besides Allen and Ryan, few others have investigated what type of feedback is most beneficial to the microteacher. Should the feedback be very specific to the skill? What if it is general? Should it all be positive?

Acheson (1964) compared the differences between feedback consisting of a video tape of thelesson and either direct supervisory feedback, indirect feedback, or no critique. He found no differences between direct feedback (where the supervisor suggested specific things for the student to correct) and indirect feedback (where the supervisor asked general questions and

reinforced the subject's intentions to produce more student talk) on either the number of completed verbal transactions between individuals or the amount of teacher dialogue. Both groups, however, were superior to the group not receiving any supervisor feedback.

McDonald and Allen (1967) compared four types of feedback treatments. The control treatment consisted of self-feedback based on written instructions giving the microteachers very general things to think about while viewing the video tape. The subjects in the self-feedback condition received the same material as the control groups but also got a very specific description of the desired behavior, were told to reward pupils, and were given a sample rating sheet. The subjects in the reinforcement only condition received the same written instructions as in the self-feedback and control conditions and the experimenter viewed three video tapes with them, verbally reinforcing all instances of desired behavior. The fourth treatment was reinforcement and discrimination training in which all of the other treatments were combined and the experimenter provided discrimination training for the subjects. A covariance analysis on ratings of video tapes shows the reinforcement and discrimination treatment was best, the reinforcement only treatment second, and the self-feedback and control conditions poorest. The difference between the self-critique and supervisor-critique sessions could have been a result of the time spent on the material. If the conferences were all thirty minutes long, however, then

the difference between the reinforcement and reinforcement discrimination groups might have been due to the discrimination training, suggesting that microteachers need information on how their behavior affects students. This would lead to the conclusion that direct feedback is superior to indirect feedback. The only significant difference, however, showed that the reinforcement and discrimination training was better than all of the others, implying that only straight reinforcement is as ineffectual as the self-feedback conditions. However, for any valid conclusions to be drawn, the study needs to be replicated using several skills and different experimenters and controlling the time spent in feedback. Also, to be of use for institutions using limited microteaching, the experiment needs to be conducted at the beginning of a series of microteaching situations rather than after, so that the microteachers do not expect a certain kind of feedback.

OTHER USES OF MICROTEACHING

Microteaching is being used for many purposes other than for training new teachers. Since in-service microteaching programs have been instituted, the assumptions behind them and their implementation need to be researched. For example, what type of skills should in-service teachers practice? Do they require the same type of feedback as new teachers? Do they need to teach real students, or can they microteach peers and benefit from the experience? Should the microteaching be conducted right in the classroom or should it be done after school with a small group of students?

Microteaching has also been used to produce positive affect. But if affect rather than the development of teaching skills is desired, is the microteaching model unaffected? Do microteachers need to work on a given skill? Is a model important? Are feedback and reteach sessions necessary? Is affect enhanced if real students rather than peers are taught. Where in an educational sequence is microteaching most effective? Can we produce enough change in affect to make microteaching worthwhile? All of these questions are important and, as of yet, little has been done to answer them.

Microteaching may also be used in validating instructional systems. But questions need to be asked about whether microteaching efficiently validates materials and whether the small size of the microclass has any bearing on conclusions about the materials. However, if microteaching is viable, it might be possible to combine teacher training and the validation of new materials.

Microteaching assumes another role when it is used as a screening procedure in hiring teachers. But advocates of the function of microteaching need more research to support their enthusiasm. A series of microteaching sequences might be used to screen out first year college students who are not suited to teaching (Boeck, 1972). If used this way, the focus of the microteaching must be specified. Is it the learning of a specific skill or rather the learning of how to plan and carry through a lesson? For screening unsuitable teachers, is peer teaching effective, or would contact with real students be better?

Microteaching has also been employed to teach students. Sadker (1972) used a microteaching format to teach elementary school pupils to ask more and higher-order questions. While this experiment does not answer the question of whether the increased use of questions is due to microteaching or to a contingency reward system, it leads to the possibility of further investigation of the techniques, skills, and type of students which are useful in training students.

While there are many conceivable uses for microteaching, without more research on the model itself and more accurate measures of the variables and results, we cannot assume that it is useful. We need to determine where in a curriculum microteaching is most important and why we are using it. From there we can refine the model and determine the most efficient type of microteaching for every situation.

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