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Effects on the Verbal Teaching Behaviors of Beginning Secondary Teacher Candidates' Participation in a Program of Laboratory Teaching^{1,2}

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MICRO-TEACHING was developed at Stanford as one means of inducting candidates gradually into the reality of teaching (Allen, 1966) and has received widespread attention in recent years. It has been described as "a teaching situation which is scaled down in terms of time and numbers of students" (Allen and Clark, 1967). Typically, micro-teaching lessons or episodes vary from 5 to 20 minutes in length and are taught to pupils in small groups (three to ten individuals). After teaching a micro-lesson, teachers receive immediate feedback.

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One element in the standard Stanford program, in addition, has been a recording (usually videotaped) of the teacher at work; this record constitutes all or a portion of the feedback. The basic procedure of micro-teaching has been adopted into various programs and adapted in others (for example, Amidon and Rosenshine, 1968; Goodkind, 1968). One adaptation is represented by the Teaching Laboratory developed at The University of Texas at Austin.

Based on the micro-teaching rationale, the Teaching Laboratory (TL) is an integral

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component of the introductory course in teaching taken by undergraduate secondary teacher candidates. Laboratory teaching employs short lessons (five to ten minutes in length) taught to peers. As "pupils," peers are not instructed to "role play" secondary pupils, but rather to be themselves. This basic modification of an asserted principle of micro-teaching was imperative in the situation in order that the TL component might be incorporated into the program. TL lessons are audio-recorded, and candidates' individual tapes are available in a listening facility as one means of feedback. Other standard feedback procedures include pupil reaction forms, completed after each lesson, and instructor comments.

Central to the TL rationale and practice is a set of instructional modules or pedagogic tasks (for example, clarifying instructional objectives, questioning, explaining). Usual procedure involves study, discussion, demonstration lesson, and candidates' TL practice with each task during a two-week teach-reteach cycle. During several semesters, the TL component has made possible candidates' teaching 10-13 laboratory lessons and attending to five or six tasks.

The general popularity of micro-teaching seems not to have attracted concomitant research attention. However, several studies completed at Stanford (Allen and Fortune, 1966; Fortune, 1966; Cooper, 1966) suggest its validity. This research reveals that graduate teacher candidates were rated significantly higher by pupils as a function of micro-teaching experience. Candidates' ratings by their pupils during the internship were also higher for those who had micro-teaching programs (Aubertine, 1964). While important, these studies do not indicate which, if any, specific teaching behaviors of candidates were altered through these procedures.

Such essential questions may be investigated only through the use of observation instruments by which discrete teaching behaviors may be classified. The present study was designed to yield direct evidence of differences in undergraduate teacher candidates' verbal teaching behaviors associated

with their participation in a program of Laboratory Teaching. In addition, it is one study in a program of research and development activities directed toward empirical examination and expansion of laboratory teaching in preservice teacher education.

Procedure

Subjects were 140 secondary teacher candidates enrolled in six sections of the first course in teaching in the professional sequence at The University of Texas at Austin. Subjects in Group A (N=85) were enrolled in three sections which incorporated the TL component as a prominent feature of the course. Subjects in Group B (N=55) were enrolled in three sections which did not incorporate the TL component. Facilities, scheduling, and other logistic problems made true random sampling impractical for this programmatic inquiry; therefore intact groups were used. Nevertheless, a conclusion of biased assignment to groups as a function of enrollment in the sections cannot be argued seriously. Composition of sections may be viewed, indeed, as a type of randomness. During course registration, Ss' opportunity to be in a particular section was restricted only by assigned registration hour. Registration was permitted on a first-come-first-served basis.

At the beginning of the 1968 spring semester, all Ss taught a ten-minute "pretest" under TL conditions. They prepared this laboratory lesson on the instruction, "On (date), you will teach a ten-minute lesson to a small group of your classmates. Teach the best that you know how. You may select any topic in your teaching field that is appropriate to teach at the secondary school level." During the seven-week experimental period that followed the "pretest," Ss in Group A engaged in two cycles of TL activity. The two TL tasks involved were (a) clarifying instructional objectives and (b) interacting.

In each cycle, Ss taught a TL lesson; received pupil, instructor, and audio-tape recorded feedback; then taught a reteach lesson. These TL lessons were from five to eight minutes in length. Ss in Group B read

		Adjusted Means		F	P
		Group A	Group B		
Category Scores					
Problem Structuring	(PBST)	1.01	.60	1	
Divergent Questions	(DVG)	7.36	3.11	28.67	.0000
Probing 1	(PB1)	2.45	1.16	6.63	.0107
Probing 2	(PB2)	3.13	1.47	10.48	.0019
Convergent Questions	(CVG)	1.26	1.23	1	
Informing	(INFO)	39.81	73.86	83.86	.0000
Pupil Questions	(PQ)	3.36	1.59	6.69	.0104
Pupil Statements	(PST)	3.20	.99	7.86	.0059
Pupil Responses	(PRS)	18.67	4.10	97.36	.0000
Considering-Supporting	(CNSUP)	4.17	2.28	9.47	.0029
Teacher Repeats Pupil Answer	(TRPA)*				
Teacher Clarifies	(TCLA)	11.41	4.69	25.01	.0000
Procedural-Nonsubstantive	(PRNS)	1.68	3.29	7.56	.0068
Ratio Scores					
Nonsubstantive/Substantive		.02	.03	7.53	.0069
Teacher Solicitation/Total Teacher Talk		.14	.07	30.34	.0000
Teacher Talk/Total Talk		.75	.93	95.71	.0000
Teacher Solicitation/Teacher Informing		.31	.10	49.70	.0000
Pupil Initiation/Total Pupil Talk		.24	.24	1	
Indirect/Direct		.45	.17	69.07	.0000
Divergent/Convergent		.92	.61	12.66	.001
Probing/Total Teacher Talk		.06	.03	11.31	.0014
PB1/PB2		.45	.51	1	

* Difference among group slopes due only to chance.

Table 1. Adjusted Means of LOSCAR Category and Ratio Scores and ANCOVA Results

and discussed issues and problems in teaching in regular class sessions. Some of the topics discussed were those also treated in the Group A sections. Group B Ss had no direct experience in teaching. Following the experimental period, all Ss taught a ten-minute "post-test."

The criterion measure was the *Laboratory Observation Schedule and Record (LOSCAR)*. This instrument, developed by Smoot (1968a), is a modification of *OSCAR 5V* (Medley and others, 1968). The *LOSCAR* yields 13 category scores and 9 ratio scores. Inter-observer reliability was calculated to be .76. Data obtained from live observations of the pre- and post-teaches were subjected to analysis of covariance procedures employing the CDC 6600 computer program *COVARY* (Veldman, 1967, p. 16).

Results

Adjusted group means for Groups A and B on both criterion TL lessons and the resultant F-ratio for each of the 22 variables are presented in Table 1. Statistically significant differences between the groups were

obtained for 17 of the variables. Groups did not differ in the percentage of utterances that were categorized as Problem Structuring and Convergent Questions, nor in the proportions of Probe 1 Questions to all probing questions or of pupil initiated utterances to all pupil talk. On only two of the variables, INFO and the ratio of teacher talk to total utterances, did the Group B candidates' scores exceed those of the Group A students; this result may be interpreted as "favoring" Group A. The number of significant differences thus favoring Group A (17 of 22) was itself significant (Sakoda, Cohen, and Beall, 1954).

Discussion

That teacher candidates' verbal teaching behaviors can be modified in a Teaching Laboratory is clearly demonstrated by these findings. The observed changed behaviors are the more significant when several factors are highlighted.

The length of time for the experimental treatment was short, less than half a semester. To alter teaching behaviors is commonly assumed to require a much longer period of

time. Changes occurred, also, as a consequence of only two specific instructional tasks (involving two laboratory cycles). In each cycle, candidates taught only two short (five to eight minute) lessons. Additionally, candidates in the TL received only minimal feedback. They listened to audio tapes of their lessons without a structured listening guide and without personal supervision. To be important to them, this type of feedback would have to have been perceived, analyzed, and interpreted by them personally. Subjects were beginning teacher candidates; and, having only little experience and that in a TL, their analytic and interpretive ability undoubtedly must be assumed to have been minimal. The extent to which the feedback was helpful may be assumed to be related to the specificity and reality of the TL tasks.

Not only were the verbal teaching behaviors of secondary candidates changed, their variety increased. At the outset of the experiment, Ss in both groups employed in their teaching a restricted group of teaching behaviors. The teachers informed (lectured or "talked to") a great deal, their questions were mostly convergent, their pupils initiated and responded little, and the teachers clarified little. By the end of this experiment, Ss in Group A (TL component) asked fewer convergent and more divergent and probing questions. They also informed less, clarified more, and uttered fewer procedural-nonsubstantive units. Their pupils initiated and responded more and were supported more than were pupils in Group B. In general, candidates with TL experience seem to have developed an expanded repertoire of teaching behaviors. This awareness of and skill in a variety of verbal teaching behaviors should increase the probability of candidates' deriving maximum benefit from student teaching. As candidates drew on these behaviors in specific teaching tasks, they exhibited a mosaic of teaching which was illustrative of greater behavioral flexibility and one probably conducive to increased pupil learning (Amidon and Flanders, 1961; La Shier, 1965).

These results, based on a portion of the first semester of a systematic study of teach-

ing, point to the possibility of increased behavioral changes throughout the teacher education program. This possibility seems destined to be abortive, however, unless candidates continue to be involved in increased specificity and realism in teaching (Davis and Gregory, 1970). Additional TL-type components, in special methods courses and in student teaching, should be productive.

Caution is suggested in interpreting and generalizing these results. That instructors of the six class sections were different individuals may have contributed in unknown ways to the results. Also, the well-known Hawthorne effect may have been operative. Both the classes and the students may have possessed important unspecified differences. These limitations seem common to much educational research, particularly that in teacher education, and consequently should temper rather than enfeeble interpretation. Another, perhaps more important variable and specific to the TL, is the use of peers as pupils. Their influence on their colleagues' behaviors may have been considerable; on the other hand, it may have been negligible. An empirical study of the effects on teacher candidates' verbal behaviors of peers and "real pupils," long overdue, is now under way as a part of the continuing research program.

This study also demonstrates the research possibilities inherent in an ongoing programmatic situation. Data useful for decision making may be possible to collect at one time only. Later, that situation no longer exists and will not recur. Such a case was the context of this study. Now, there are no non-TL sections of the introductory course at this university; the opportunity for this type of inquiry existed only once.

Clearly, the evidence presented here demonstrates the power of a Teaching Laboratory and its integral delineation of specific teaching tasks. Secondary teacher candidates who experienced the TL in the initial segment of their teacher education program were seen to have exhibited not only changed behaviors, but an increased variety in their verbal teaching as well. Subsequent research will inquire into the persistence and stability of these changed behaviors.

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