DOCUMENT RESUME

ED 055 035	24	SP 005 268
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TITLE	Training in Teaching Strategies: An Experimental Project. Final Report.	
INSTITUTION	North Dakota Univ., Grand Forks.	
SPONS AGENCY	Office of Education (DHEW), Washington, D.C. Bureau of Research.	
BUREAU NO	BR-0-F-073	
PUB DATE	Aug 71	
GRANT	OEG-6-70-0039(509)	
NOTE	31p.	
EDRS PRICE	MF-$0.65 HC-$3.29	
DESCRIPTORS	*Educational Strategies; Microteaching; *Oral Communication; *Student Teachers; *Teacher Education; *Teaching Techniques	

ABSTRACT

This study was to determine if training in teaching strategies would result in use of a wider variety of teaching strategies. In the first training method used, a videotaped model of the strategies was shown to the trainees, and its elements analyzed and discussed. The trainees attempted to reproduce the strategy in microteaching situations. In the second method, trainees were taught the process of creating or triggering teaching behaviors from the observational systems. They planned lessons where specific behavior could occur and tried out the plans in microteaching situations. Three groups of subjects were used: 1) a control group of 34 traditionally prepared student teachers; 2) a didactic group of 27 students; and 3) an eclectic group of 23 students. Tape recordings were used to measure the variety of strategies and were analyzed according to Joyce's System for Analyzing the Oral Communications of Teachers. The mean score on variety of strategies exhibited by the control group. Training of teaching strategies. For student teachers in home economics, the didactic training method was equally as effective as the eclectic method in increasing the variety strategies exhibited. The study demonstrated that s[illegible]aining in teaching strategies is effective. (Author/MBM)

Final Report
Project No. 0-F-073
Grant No. OEG-6-70-0039(509)

TRAINING IN TEACHING STRATEGIES: AN EXPERIMENTAL PROJECT

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August 1971

The research reported herein was performed pursuant to a grant with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

U.S. DEPARTMENT OF
HEALTH, EDUCATION AND WELFARE

Office of Education
Bureau of Research

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SUMMARY

The purpose of the study was to determine if training in teaching strategies would result in use of a wider variety of teaching strategies.

Two methods of training were tested. The first was basically didactic. A video taped model of the strategy was shown to the trainees. The elements of the strategy were analyzed and discussed. In microteaching situations the trainees attempted to reproduce the strategy. Trainees learned four teaching strategies from Joyce's Models of Teaching: Taba's inductive strategy, Bruner's concept attainment strategy, Suchman's inquiry strategy, and Ausubel's advance organizer strategy. The trainees also learned to use two classroom observational systems to analyze and discriminate teaching behaviors: Joyce's System for Analyzing the Oral Communications of Teachers and the Cooperative Educational Research Laboratory, Inc. Classification of Verbal Behavior.

In the second training method, basically eclectic, no models were presented. Rather, the trainees were taught the process of creating or triggering teaching behaviors from the observational systems. Trainees planned lessons where specific behaviors could occur and tried out the plans in microteaching situations.

The experiment consisted of three groups of subjects. The control or baseline group was student teachers in home economics who had only the traditional preparation prior to student teaching (N=34). They did their student teaching fall quarter. The didactic group (N=27) was trained fall quarter and did their student teaching winter quarter. The eclectic group (N=23) was trained winter quarter and did their student teaching spring quarter.

The variety of teaching strategies used by each subject while student teaching was measured by tape recordings. Four lessons were taped each week. The tapes were analyzed according to Joyce's System.

The mean score on variety of strategies exhibited by the control group was 2.61, 4.44 by the group trained didactically, and 4.22 by the eclectically trained group. Training in teaching strategies was effective in increasing the available repertoire of strategies ($p < .0005$). For student teachers in home economics the didactic training method was equally as effective as the eclectic method in increasing the variety of strategies exhibited.

If one of the goals of teacher preparation programs is to produce teachers who can adopt teaching strategies appropriate for different educational objectives, for different kinds of content, and for different kinds of learning, specific training in teaching strategies is effective.

INTRODUCTION

The overall purpose of this study was to determine how to provide prospective teachers with a variety of available teaching strategies. Observational studies of the classroom, such as those by Aschner, Bellack, and Hudgins and Ahlbrand, have indicated that teachers exhibit a very limited repertoire of teaching strategies.[1] These studies support Flanders' rule of two-thirds which states that teachers do two-thirds of the talking in the classroom and two-thirds of that talk is structured and direct.[2] Also, Stevens found 80 percent of the classroom talk devoted to asking, answering and reacting to factual, memory-level questions.[3]

Different teaching strategies are differentially effective for certain kinds of learning. For example, Taba found that narrow questioning by teachers controlled and limited the cognitive functioning of pupils and actually inhibited productive mental activity.[4] Wittrock found different strategies were needed for expository than for discovery learning.[5]

Different strategies are needed for different kinds of learners. The classic study by Heil, Powell and Feifer found different strategies effective with learners of varying characteristics.[6] Not all learners

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[1]M. J. Aschner, The analysis of verbal interaction in the classroom. In A. A. Bellack (ed.), Theory and research in teaching, Teachers College Press, 1963; A. A. Bellack, et al., The language of the classroom, Teachers College Press, 1966; and B. B. Hudgins and W. P. Ahlbrand, A study of classroom interaction and thinking, Central Midwestern Regional Education Laboratory, 1967.

[2]N. A. Flanders, Teacher influence, pupil attitudes, and achievement, Coop. Res. Monograph No. 12, Office of Education, U. S. Department of Health, Education and Welfare, 1965.

[3]R. Stevens, The question as a measure of efficiency in instruction: A critical study of classrom practice, Teachers College, Columbia University, Contributions to Education No. 48, 1912.

[4]H. Taba, Teaching strategies for cognitive growth. In E.M. Bower & W.G. Hollister (eds.), Behavioral science frontiers in education, Wiley, 1967.

[5]M. C. Wittrock, The learning by discovery hypothesis. In L. Shulman & W. Kieslar (eds.), Learning by discovery, Rand McNally, 1966.

[6]L. M. Heil, M. Powell & I. Feifer, Characteristics of teacher behavior and competency related to the achievement of different kinds of children in several elementary grades, Office of Testing and Research, Brooklyn College, 1960.

learn in the same ways. Some learners learn better under highly structured, teacher-directed strategies while others learn more from cooperative, student-centered teaching.[7]

Different strategies have different effects on learners. Work by Harvey and his associates has shown that structured and authoritarian strategies result in more dependence on the teacher, more concreteness in pupil responses, and less cooperation and involvement in the classroom.[8] Integrative and indirect teaching strategies have been shown to produce more involvement, more abstractness in responses, greater independence, and less anxiety.[9]

If the goal of education is to produce persons who are questioning, inventive, original, and creative, teachers need to be able to use a variety of teaching strategies -- for different educational purposes and for different kinds of learners. Educational ends demand more than one way of teaching. The teacher who cannot vary his style is limited. He needs to be able consciously to select from a repertoire of strategies that will obtain different objectives and induce different students to learn. Different teaching behaviors are appropriate to different ends. Some lessons should be sequenced and directed. Others should be emerging and cooperative. Because of the past history of

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[7]D. E. Hunt, A conceptual systems change model and its application to education. In O. J. Harvey (ed.), Experience, structure and adaptability, Springer, 1966; D. W. Stuempfig & M. L. Maehr, The effects of conceptual structure and personal quality of feedback on motivation, paper read at American Educational Research Association annual meeting, Minneapolis, 1970; and P. D. Tomlinson & D. E. Hunt, The differential effectiveness of three teaching strategies for students of high and low conceptual levels, paper read at American Educational Research Association annual meeting, Minneapolis, 1970.

[8]H. H. Anderson & J. E. Brewer, Studies of classroom teachers' personalities III: Effects of teachers' dominative and integrative contacts on children's classroom behavior, Applied Psychology Monographs, No. 8, 1946; O. J. Harvey, et al., Teachers' beliefs, clasroom atmosphere and student behavior, American Educational Research Journal, 1968, 5, 151-166; and O. J. Harvey, et al., Teachers' belief systems and preschool atmosphere, Journal of Educational Psychology, 1966, 57, 373-381.

[9]Anderson & Brewer, loc. cit.; N. A. Flanders, Personal-social anxiety as a factor in experimental learning situations, Journal of Educational Research, 1951, 45, 100-110; Harvey, et al., American Educational Research Journal, 1968, 5, 151-166; and Harvey, et al., Journal of Educational Psychology, 1966, 57, 373-381.

teaching (i.e., the persistence of recitation and lecturing strategies)[10] teachers need to acquire inductive, cooperative strategies rather than continue using direct verbal instruction. However, the intent is for the teacher to have available a variety of strategies.

Measurement of Teaching Strategies

A strategy is a set of verbal behaviors employed as a means of achieving a content objective. Thus strategies involve goals and the ways teachers behave in achieving such goals.

Teaching strategies range from the highly directive, where most of the ideas are identified in advance and presented to the learner, to the inductive and cooperative, where teacher and students work together to attack problems. Teaching strategies also range from mass methods to the highly personal or individual. They specify the means that are to be used to achieve the goal.

The function of a teaching strategy is to provide a model around which an educational environment can be built. Smith has identified two basic dimensions of strategy.[11] The treatment dimension concerns the type and sequence of operations that the teacher and students enter into; the focus is cognitive. The control dimension deals with those operations that the teacher uses to guide and control the participation of learners; the focus is on the learner's behavior.

Joyce has identified several aspects of teaching strategies that can be acted on: (1) syntax or structure, i.e., the phases of activity, purpose of each phase, and relationships between phases, (2) social systems, (3) principles which govern the responses or reactions by teachers to the activity of the learner, and (4) support systems required.[12]

Syntax as referred to by Joyce is very similar to Smith's treatment dimension. The social system created and the principles of reaction of

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[10] N. A. Flanders, Teacher influence in the classroom. In A. A. Bellack (ed.), Theory and research in teaching, Teachers College Press, 1963; and J. Hoetker & W. P. Ahlbrand, The persistence of recitation, American Educational Research Journal, 1969, 6, 145-167.

[11] B. O. Smith, et al., A tentative report on the strategies of teaching, U. S. O. E. Coop. Res. Project No. 1640, University of Illinois, 1964.

[12] B. R. Joyce, Models of teaching. In B. R. Joyce, The teacher-innovator: A program to prepare teachers, Superintendent of Documents Catalog No. Fs 5.258.58021, U. S. Government Printing Office, 1968.

Joyce make up Smith's control dimension. Joyce, along with classroom teachers, recognizes the importance of adequate support systems.

For the purposes of this study a teaching strategy was defined as the process of the verbal development of the content or subject matter of the lesson, including what pupil behaviors are sanctioned and how, how and by whom classroom procedures and standards are developed or imposed, and what kinds of responses pupils make.

Teaching strategies were operationally defined from the Joyce system. The strategy used was identified as lecturing when the score on the teacher "delivering information" (I-4)* was greater than 60 percent.

A recitation strategy consisted of a narrow question asked by the teacher, followed by a short response by the pupil. The pupil's response elicits a sanctioning attainment response from the teacher. Then the cycle begins again with another question. Operationally, a recitation strategy is indicated by a score greater than 60 per cent on "questioning for precise answers" (I-3). It is accompanied by very high scores on "sanctioning attainment" (S-3) and "student pre-structured response" (R-3).

An amplified recitation strategy consisted of the teacher asking a narrow question, followed by a pupil's short response which elicited an attainment sanction. This was followed by the teacher delivering a few comments and asking another question to start the cycle again. The teacher's comments are of a clarifying or expanding nature on the pupil's response or delivering information relative to the next question to be asked. This strategy was defined as scores of 50 percent ± 5 percent on "questioning students for precise answers" (I-3) and "delivering information" (I-4). Like the recitation strategy, it is accompanied by high scores on "sanctioning attainment" (S-3) and "student pre-structured response" (R-3).

A reflective teaching strategy is defined by Hunt and Joyce as one which utilizes the learner's frame of reference to encourage questioning or hypothesizing.[13] They have operationally defined reflective teaching as scores greater than 10 per cent on "helping students theorize" (I-1) and "helping students toward self-expression" (I-2). Reflective teaching is accompanied by high scores on "sanctioning search behavior" (S-1),

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*Refers to categories of the Joyce System.

[13] D. E. Hunt & B. R. Joyce, Teacher trainee personality and initial teaching style, American Educational Research Journal, 1967, 4, 253-259.

"sanctioning self-expression" (S-a), and "student original response" (R-1).

Flanders' rule of two-thirds states that teachers do two-thirds of the talking in the classroom. A teaching strategy in which pupils do more than their one-third share of the talking is identified as pupil participation. When the ratio of pupil talk to teacher talk was greater than 1:2 the strategy was designated as pupil participation.

Prescriptive planning is the name given to the strategy in which the teacher imposes plans or standards, either his own or those of an authority. Scores greater than 28 on "imposing a plan or procedure" (P-3) and "imposing a standard of performance" (P-4) are designated as prescriptive planning.

Cooperative or teacher-pupil planning is the term used to designate the teaching strategy in which the teacher tries to involve the pupils in helping determine the plan, procedure, or standard (P-1 and P-2). Scores greater than 10 on P-1 and P-2 are indicative of teacher-pupil planning.

Purposes and Hypotheses

Teacher education programs traditionally make students aware of the fact that there are different teaching strategies, but no deliberate attempts are made to teach strategies to prospective teachers. No efforts are made to give them a viable, workable repertoire of strategies. It is taken for granted that since prospective teachers have been told about a variety of teaching strategies they "know" them.

The purposes of the study were (1) to determine whether teachers do indeed "know" a variety of teaching strategies well enough to be able to use them or if specific training in teaching strategies is needed, and (2) to determine which of two methods of training teachers to use a greater variety of teaching strategies is more effective.

The hypotheses tested were:

1. There is no difference between those trained in teaching strategies and those not trained with respect to the variety of teaching strategies exhibited during student teaching.
2. There is no relationship between the training method used and the variety of teaching strategies exhibited by the trainees during student teaching.

METHODS AND PROCEDURES

Two different methods of training prospective teachers in a variety of teaching strategies were implemented through a three credit elective course offered fall and winter quarters 1970-71 for home economics students, prior to student teaching. During the fall quarter, the didactic training method was implemented; the eclectic training method was used winter quarter.

Before beginning the actual training, some experience in the observation of teaching was necessary in order to discriminate and analyze various teaching behaviors. Trainees learned two classroom observational systems. The observational systems served as a tool for developing the trainee's skill in observation and analysis of teaching and provided the framework within which to conceptualize teaching.

Since any classroom observational system includes only certain aspects of the total classroom situation and ignores others, more than one system is needed by the teacher candidate in order to analyze the total situation.[14] Two observational systems were selected for use in the training procedures. The first was Joyce's System for Analyzing the Oral Communications of Teachers.[15] This system has been used successfully in identifying styles of teaching.[16] Since the Joyce System categorizes only teacher talk, several categories were added to classify pupil talk. (Description of the additional categories is found in the Appendix.)

The second observation instrument, the CERLI Verbal Behavior Classification System is a flexible two-dimensional instrument combining

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[14] B. B. Brown, Multidimensionality: A technique for studying the classroom, paper read at American Educational Research Association annual meeting, Minneapolis, 1970.

[15] B. R. Joyce & B. Harootunian, The structure of teaching, Science Research Associates, 1967.

[16] See, for example, C. Rathbone & B. Harootunian, Teachers' information handling when grouped with students by conceptual level, paper read at American Educational Research Association annual meeting, New York, 1971; M. A. Seperson, The teaching styles of student teachers as related to the teaching styles of their cooperating teachers, paper read at American Educational Research Association annual meeting, New York, 1971; and P. D. Murphy, Conceptual Systems and teaching styles, paper read at American Educational Research Association annual meeting, Minneapolis, 1970.

four process categories: seek, inform, accept, and reject, with four substantive categories: memory, productive-critical thinking, expressed emotion, and class management.[17] This system employs a time dimension not found in the Joyce System.

The Joyce System was taught at the beginning of the training; CERLI system was taught later. Audio tape recorded lessons taught by student teachers in home economics during the 1969-70 school year were used in training the students to use the coding systems. Teacher candidates learned to use each system by identifying teaching behaviors from audio tape recordings of teaching episodes and placing them in the categories provided by the system.

After the students learned to discriminate various teaching behaviors using the Joyce System (approximately one week of practice was required) the actual training in teaching strategies began.

Didactic Training Method

The didactic training method, implemented fall quarter, involved the presentation of audio and video taped models of the teaching strategies to be learned.

While there are as many possible teaching strategies as imaginative teachers can create, Joyce, in "Models of Teaching," has identified a number of teaching strategies based on theoretical models of education.[18] Of these, four strategies were selected as particularly relevant to the objectives and the structure of knowledge of home economics. The four were:

1. An inductive teaching strategy developed from the work of Hilda Taba.
2. A strategy for inducing students to attain concepts derived from work by Jerome Bruner and associates.
3. An inquiry training model developed from work of

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[17] Cooperative Educational Research Laboratory, Inc., CERLI, Verbal-Behavior Classification System (CVC), Cooperative Educational Research Laboratory, Inc., Northfield, Illinois, 1969; A. Simon & E. G. Boyer (eds.), Mirrors for behavior II: An anthology of observation instruments, Volume B, Classroom Interaction Newsletter in cooperation with Research for Better Schools, Inc., 1970, pp. 40-4.

[18] Joyce, Models of teaching.

Richard Suchman.

4. An advance organizer strategy derived from David Ausubel's work.[19]

The same procedure was used to teach each strategy. First, a video taped model of the strategy was shown to the students. The video taped episode depicted a graduate student in home economics education as the teacher with local high school students as the pupils. The teacher taught a concept using the strategy. The video taped models were approximately twenty minutes in length.

After the video taped model was shown to the students the theory underlying the model was discussed and phases of the strategy pointed out. At the following class session the investigator taught the students using the strategy and the elements of the strategy were again discussed.

The students met in small groups for microteaching. Each student planned a lesson to use the current strategy. Lessons were taught to peers, videotaped, and critiqued by peers and the supervisor. Lessons were revised as necessary, then taught to a group of four or five high school pupils, video taped, and critiqued by the supervisor and the peer group. If the strategy was not successfully reproduced it was

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[19]Descriptions of the strategies are found in Joyce's Models of Teaching. Additional information necessary to build the strategies is reported in H. Taba, Teaching strategy and learning, California Journal for Instructional Improvement (December, 1963), pp. 3-11; H. Taba & F. F. Elzey, Teaching strategies and thought processes, Teachers College Record (March, 1964), pp. 524-534; H. Taba, Teaching strategies and cognitive functioning in elementary school children, Coop. Research Project No. 2402, San Francisco State College, 1966; H. Taba, Thinking in elementary school children, Coop. Research Project No. 1574, San Franciso State College, 1964; J. S. Bruner, The process of education, Harvard University Press, 1961; J. S. Bruner, Toward a theory of instruction, W. W. Norton, 1966; J. S. Bruner, et al., Studies in cognitive growth, Wiley, 1966; J. R. Suchman, The elementary school training program in scientific inquiry, U. S. Office of Education Project No. A-216, University of Illinois, Urbana, 1962; J. R. Suchman, Inquiry training; Building skills for autonomous discovery, Merrill-Palmer Quarterly, 1961, 7, 147-169; J. R. Suchman, Inquiry training in the elementary school, Science Teacher, 1960, 27, 42-47; D. P. Ausubel, The psychology of meaningful verbal learning, Grune and Stratton, 1963; D. P. Ausubel, In defense of verbal learning, Educational Theory, 1961, 11, 15-25; and D. J. Pucel, The relative effectiveness of the traditional and two modified methods of organizing information sheets, Office of Education Report No. 5-8458, University of Minnesota, 1966.

revised and a second group of high school pupils was taught.

A nonthreatening environment was provided where the students were encouraged to take risks, praised for attempting to learn new behavior patterns, praised rather than criticized for experimental failure, and supported in their attempts at self-evaluation and self-analysis of teaching behaviors. Supervision and feedback were provided continuously during the training program through the analysis and critique of taped lessons. Critique included the use of the previously learned observational systems by both supervisor and college students.

When the strategy was learned, i.e., could be satisfactorily used with high school pupils, a new strategy was introduced to the class following the same procedure. The strategies were presented in the following order: (1) Taba's inductive strategy, (2) Bruner's concept attainment strategy, (3) Suchman's inquiry strategy, and (4) Ausubel's advance organizer strategy. Approximately two weeks were spent on each strategy.

The students spent two hours each week in large group sessions taught by the investigator where the video taped models were presented and the strategies were explained. Each student spent at least two hours per week in the microteaching group. The supervisor was available additional hours to assist students in planning or revising lessons.

Eclectic Training Method

In the eclectic training method, implemented winter quarter, trainees learned the same two observational systems to analyze and discriminate teaching behaviors. However, no models of teaching strategies were presented. The trainees built their own teaching strategies. Students met as a class for one hour per week at which time the process of creating or "triggering" behaviors found in the observational systems was taught. These observational systems comprise a bank of behaviors from which teachers may select. While coding and analyzing taped lessons to learn the observational systems, it was noted that certain categories were rarely used; for example, from the Joyce System, "Helping students theorize," or from the CERLI System, "Empathizes with feelings expressed." Students would then deliberately attempt to build a lesson in which this behavior would occur. The investigator used numerous techniques herself in teaching this class.

The students spent four hours each week in small group lab sessions of four to five students with a supervisor. In the lab sessions they discussed the kinds of behaviors teachers exhibit and proposed strategies of their own. For example, some proposed a strategy in which they would involve the pupil in setting standards, or getting the pupils to

theorize and hypothesize, or asking higher level questions.

In each case, the students endeavored to teach the behavior models they developed. They taught each other and also taught high school pupils following the same microteaching procedure, i.e., teach to peers (video taped), critique, revise, and reteach to high school pupils. When the student had satisfactorily produced the strategy she intended, she devised another.

The practice opportunities, feedback, supervision, and non-threatening environment were the same for both training methods. The manipulated variable was the manner of presentation of the strategies. In the first training method the strategies were presented as models to be learned while in the eclectic training method the strategies were created by the trainees.

Subjects

Home economics students who planned to student teach during the 1970-71 academic year participated in the project (N=84). These students had already taken the traditional methods courses. The training in teaching strategies was additional preparation. Those student teaching fall quarter served as the baseline group (N=34). They received no special training in teaching strategies. Those teaching winter quarter participated in the didactic training session fall quarter (N=27) while those teaching spring quarter participated in the eclectic training session winter quarter (N=23).

Students had selected the quarter for their student teaching the year earlier. No bias entered into their selection as they were unaware of any experimental project at the time they chose the quarter for student teaching.

Student teachers were assigned to student teaching centers across the state of North Dakota, with two or three each quarter assigned in west central Minnesota. These centers are regularly used by the Home Economics Education Department. The enrollment in the participating high schools ranges from 100 to 350.

Supervisors of the student teachers, both the high school cooperating teacher and the University supervisor, were urged to encourage the student teachers to try as many strategies as possible and to vary their teaching. The fall quarter student teachers (who were not trained in the use of strategies) were likewise encouraged to try various approaches to teaching without any reference being made to "strategies."

Data Collection

The variety of teaching strategies exhibited by the two experimental groups and the baseline group was measured during the regular

student teaching experience. The fall quarter student teachers who received no training in strategies recorded three lessons during their student teaching experience to provide baseline data on the teaching behaviors used.[20] Student teachers who received the training in strategies were instructed to record four lessons each week to provide data on the variety of strategies used. The tapes were mailed to the University each Friday, coded and analyzed for the teaching strategies used.

The tape recordings were marked with a number only and were coded by a graduate assistant who had been trained in the Joyce coding system. This coding system has been used for several years in the depar ent's research and comparison data were available. A ten percent sampl of the tapes (randomly selected) was coded by a second trained rater (inter-rater reliability = .89).

The following procedure was used to compute the variety of strategies score for each subject. Each taped lesson was coded. Coding sheets for each recording were compared with the teaching strategies defined earlier. Each strategy used was tallied as to kind of strategy, i.e., lecture, recitation, etc. The number of different strategies recorded for each subject was totaled. For example, subject 1056 (trained eclectically) recorded: 8 lecture, 1 recitation, 1 amplified recitation, 8 reflective, 2 prescriptive planning, and 6 pupil participation, for a variety score of 6.

In calculating the variety of strategies score for subjects trained didactically the four specific strategies taught (i.e., Taba, Bruner, Suchman and Ausubel) were not counted. It was felt that to include these in the variety score would artificially inflate the scores of the didactic group. These subjects had ready-made labels to identify these four strategies which the eclectic group did not have. Also in some instances what a trainee said (on the tape) was a Taba strategy, for example, was not always a replication of Taba's inductive strategy. Therefore, the four specific strategies taught to the didactic group were not included in computing their variety score. The variety scores for both experimental groups (and the control group) were based solely on the strategies defined earlier.

RESULTS

Tests of Hypotheses

Two-sample t-tests were used to determine whether or not the

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[20] Previous studies attest to the measurement of teacher behavior using a sample of three lessons, e.g., Seperson, loc. cit.

differences in the mean scores of the groups with respect to the variety of teaching strategies exhibited could be attributed to chance. The level of significance set for rejection of the null hypotheses was .05.

Summary data for the groups are reported in Table 1. The greatest variety of teaching strategies was exhibited by those subjects trained didactically, followed by those trained eclectically. The subjects in the control group (not trained in strategies) recorded the least variety of strategies.

Table 1 Means and Standard Deviations for Variety of Teaching Strategies by Groups

Group	Variety of Teaching Strategies M	SD
Control N=34	2.68	0.90
Didactic N=27	4.44	1.45
Eclectic N=23	4.22	1.53

The first hypothesis stated that there is no difference between those trained in teaching strategies and those not trained with respect to the variety of teaching strategies exhibited. For the testing of this hypothesis, the experimental group included all subjects trained in strategies, both didactically and eclectically. The results of the two-sample t-tests for the difference between group means are reported in Table 2. The hypothesis of no difference was rejected. Each of the experimental groups (didactic and eclectic) differed significantly from the control group.

Table 2 Tests of Significance for Difference Between Group Means on Variety of Teaching Strategies by Groups

Groups	t value	df	p value
Didactic + Eclectic v. Control	5.73	82	$<.0005$
Didactic v. Control	5.82	59	$<.0005$
Eclectic v. Control	4.78	55	$<.0005$
Didactic v. Eclectic	0.52	48	ns

The second hypothesis, i.e., there is no relationship between the training method used (didactic or eclectic) and the variety of teaching strategies exhibited was not rejected. The didactic method was equally as effective in producing a variety of teaching strategies during the student teaching period as the eclectic training method.*

Table 3 presents the frequency distribution of subjects in each group on the variety of teaching strategies recorded. The median number of different strategies recorded by the didactically trained group was five, followed by four as the median for the eclectically trained group, and three for the control group.

Table 3 Distribution of Subjects by Variety of Teaching Strategies Recorded (N=84)

Group	Number of Different Strategies Recorded						
	1	2	3	4	5	6	7
Didactic* N=27	1	2	4	4	11	3	2
Eclectic N=23	0	4	4	5	5	3	2
Control N-34	4	9	15	6	0	0	0

* The four specific strategies taught to this group were not included.

In Table 4 are reported the number of subjects who recorded each of the identified strategies. Lecturing remained the predominant strategy (recorded by 76.3 percent of the subjects) although 20 subjects did not record a lecturing strategy. Teacher-pupil planning was the strategy that was recorded least frequently (recorded by 10.7 percent of the subjects).

The subjects trained in strategies not only recorded a greater number of strategies but they also recorded more of the strategies that

*NOTE: When the four specific strategies taught to the didactic group were included in their variety of strategies score, the mean was 5.85 which is considerably more than the mean (4.44) without the specific strategies included. However, the variation in number of different strategies recorded was also increased (SD=2.56). The t value computed on the difference between the mean of the didactic group with the four additional strategies included and the mean of the eclectic group was 2.81 (ns).

Table 4 Frequency and Percentage of Subjects Recording Each Strategy

Group	Lecture		Recitation		Amplified Recitation		Reflective		Prescriptive Planning		Pupil Participation		Teacher-Pupil Planning	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%
Didactic N=27	25	92.6	11	40.7	21	77.8	18	66.7	20	74.1	20	74.1	5	18.5
Eclectic N=23	17	73.9	9	39.1	18	78.3	21	91.3	11	47.8	17	73.9	4	17.4
Control N=34	22	64.7	9	26.5	20	58.8	12	35.3	10	29.4	17	50.0	0	0.0

are infrequently observed in classrooms. Recent studies have shown lecturing and recitation strategies to occur most frequently followed by amplified recitation with fewer than ten percent of the subjects using reflective strategies.[21] In this study the subjects trained in strategies produced significantly more strategies that involve more abstract ways of dealing with content and involve pupils more, e.g., reflective, pupil participation, and teacher-pupil planning.

Unhypothesized Findings

Cooperating teachers and University supervisors reported that trainees exhibited greater confidence and ease of adjustment to teaching than those student teachers in the control group who did not receive the training in teaching strategies. This was expected since the trainees had experience in microteaching situations. Supervisors also reported that higher level questions were asked by the project participants than by the other student teachers. (This was also supported by data from the coded lessons.)

Supervisors also reported that pupils in the classes taught by the project participants appeared to be more interested and excited about learning than pupils in the classes of the student teachers not trained in strategies.

Most of the subjects trained didactically seemed to be able to modify and adapt the strategies to fit their own teaching style and the school situation. Some subjects, however, could not see how to actually use the strategies they had been taught. Several solved this dilemma by using the strategy as the introduction to the lesson. The strategy would end rather abruptly and the teacher would switch to the actual lesson. Sometimes the concept taught in the strategy had no relationship to the concept(s) of the remainder of the lesson.

Other Analyses of Findings

Informal conversation with the trainees throughout the two training periods indicated that some trainees did not like the highly structured didactic training method while others did not like the unstructured approach of the eclectic training method. While the preference of a student does not necessarily indicate the kind of environment in which the student learns best, it can provide clues and assist in determining appropriate learning environments.[22]

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[21] See, for example, the work of Hoetker & Ahlbrand, loc. cit.; Hunt & Joyce, loc. cit.; and Murphy, loc. cit.

[22] D. E. Hunt, A conceptual level matching model for coordinating learner characteristics with educational approaches, Interchange, 1970, 1, 68-82.

Research in education is rather naive when it seeks to find the most effective training method. The long-range requirement is for an understanding of the factors that cause a student to respond to one instructional plan rather than another. It seems more likely that one kind of training (treatment) would be more effective with trainees having certain characteristics while another type of training would be more effective with trainees possessing other characteristics. The question of the interaction of kind of training required and certain trainee characteristics has previously been raised.[23] The attempt was made in this study to identify the kind of students who did well (and less well) as a result of the training environment provided.

Following the recommendations of Berliner and Cronbach and Snow, regression analyses were used to analyze the interaction between aptitudes and treatments.[24] A regression test was first used to measure homogeneity of regression ($F \approx 0.249$, ns). The finding of significant heterogeneity signals the possibility of aptitude-treatment interaction. However, since in this case the F value was not significant, this approach was abandoned.

Data were available on participants from another research project.[25] These data were analyzed for characteristics of subjects who did well (defined as producing five or more different strategies) as a result of the didactic training as compared with the characteristics of subjects who did poorly (defined as producing fewer than five strategies). Data on subjects trained eclectically were also examined. No significant differences were found. The method of training did not interact with prior characteristics of the subjects. The students who did well as a result of the didactic training did not differ from those who did poorly as a result of the didactic training. The same was true for those subjects trained eclectically.

The data were re-grouped to compare subjects who did well with those

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[23] See, for example, P. D. Murphy & M. M. Brown, Conceptual systems and teaching styles, American Educational Research Journal, 1970, 7, 529-540.

[24] D. C. Berliner, Aptitude-treatment interactions in two studies of learning from lecture instruction, paper read at American Educational Research Association annual meeting, New York, 1971; and L. J. Cronbach & R. E. Snow, Individual differences in learning ability as a function of instructional variables, U.S.O.E. Contract No. OEC-4-6-061269-1217, Stanford University, 1969.

[25] Data available included scores on Rokeach's Dogmatism Scale Form E; Autonomy, Complexity, Thinking Introversion, and Theoretical Orientation Scales of the Omnibus Personality Inventory; Adorno's F Scale; and the 16 scales of Leary's Interpersonal Adjective Check List.

who did poorly regardless of the training method. There were no significant differences.

Cumulative grade-point averages were also obtained for the participants. There were no significant differences in mean grade-point average for participants in the various groups. There was no relationship between GPA and group or between GPA and the variety of strategies.

All attempts to identify characteristics that would account for the effectiveness of one training method for some subjects rather than others were unsuccessful. It appears that for trainees in home economics either training method is equally appropriate. It is also possible that certain learning or accessibility characteristics other than personality or academic achievement are influencing the interaction between treatment and the trainee.

Discussion of Findings

How the results of this study were affected by the difference in the number of lessons recorded could not be determined. It is possible that the more lessons the subject recorded the greater the possibility for a wider variety of strategies to appear. The control group was asked to record three lessons. Their scores on the variety of strategies ranged from one to four; scores on total number of strategies recorded ranged from one to seven. Researchers have established that a sample of three lessons gives an accurate estimate of a teacher's style or pattern. However, these studies were not concerned with <u>variety</u> of teaching behavior but rather with <u>typical</u> behavior.

The subjects in the didactic and eclectic groups were asked to record four lessons each week. Not all of them did. There was also evidence to indicate that merely making more recordings did not increase the variety of strategies. For example, one subject (trained eclectically) recorded a total of 11 strategies: 10 lecture and 1 pupil participation; one subject (trained didactically) recorded a total of 19 strategies: 15 lecture, 1 recitation, 1 amplified recitation, and 2 pupil participation. The subjects were also all aware of the fact that the project was concerned with variety of teaching strategies.

The advantage of the eclectic training method seemed to be that it built on the trainee's natural style. Unfortunately a teacher's natural style seems to be predominantly lecture and recitation and these styles have been shown to involve pupils minimally. They are also deficient in stimulating higher levels of thought in the classroom.

There seemed to be evidence that trainees did not understand the structure of their discipline and they seemed to have difficulty in knowing how to use the content of the field. Students in both training methods experienced difficulty in handling the content of home economics

in ways other than the traditional ones, i.e., how they remembered their high school teacher taught or how the subject matter was taught by the university professor. This appeared to be one of the advantages of the didactic training method, for specific ways of dealing with content were required in each of the strategies taught.

The choice of teaching strategies used by the teacher is affected by the content to be taught and by the teacher's view of that content. The training in strategies did give prospective teachers new views of the content they were to teach.

In this study all subjects "learned" a variety of teaching strategies, i.e., could produce them. There may be an interaction between the subject and the teaching environment rather than between the subject and the treatment (method of training). Situational factors may influence teaching behaviors. Emers and others have shown that the teaching style exhibited is influenced by the type of feedback expected.[26] The student teacher probably expected that certain kinds of teaching would be accepted and rewarded by the cooperating teacher. Some cooperating teachers may have (consciously or unconsciously) encouraged or discouraged the student teacher from trying a variety of new teaching behaviors. While the type of feedback the trainees expected and received was controlled by the investigator during the training period it could not be controlled during the student teaching experience. During the training the attempt was made to establish the norm or expectation of "doing something different" and trainees were rewarded for producing a variety of teaching strategies, while in the student teaching center rewards may very well have been contingent on other behaviors. The time of the year in which the student teaching was done may also have been a situational factor influencing the results. Many cooperating teachers are more willing to let a student teacher try new things during the winter term, for the cooperating teacher feels she still has the spring in which to get some "real teaching done" and get the class back on the track. The cooperating teacher who has a student teacher during the spring quarter is more apt to feel that not as much time is available for experimenting and the "material must be covered."

CONCLUSIONS

This study has demonstrated that the teaching behaviors of preservice teachers can be changed and their repertoire of strategies increased by providing training in teaching strategies. If teacher education programs are concerned that teachers can teach in a variety of ways and that they use strategies other than lecture and recitation, it is necessary to provide some specific training in other strategies.

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[26] E. T. Emers, et al., The effect of feedback expectancy on teacher trainees' preference for teaching style, paper read at American Educational Research Association annual meeting, Minneapolis, 1970.

Merely telling the prospective teacher about other ways of teaching, i.e., inquiry teaching, inductive strategies, and cooperative or teacher-pupil planning, is not sufficient to enable him to have these strategies as a part of his available repertoire. Opportunities to practice the new behaviors are also needed.

There were no differences in the results of the two training methods, i.e., the didactic and eclectic training methods were equally effective in bringing about change in the home economics student teacher's behavior.

The use of classroom observational systems was a necessary part of the training in that it provided teachers with a way to verbalize and discriminate among teaching behaviors. Realization is needed that what the teacher does is a means of limiting and prescribing what the pupil may do. To illustrate, if the teacher continually asks low-level, recall-type questions, pupils are not permitted to theorize or express their own ideas. If content is treated prescriptively and as absolute rather than relative, pupils do not have the opportunity to manipulate content in a variety of ways. The interaction patterns that were evident from the use of the observational systems made this quite obvious. A narrow question by the teacher was almost always followed by a structured response by a pupil. The use of the observational systems assisted in making the trainees "inquirers" into the teaching process.

The student teachers trained in strategies were more flexible in that they exhibited a greater variety of teacher behaviors, permitted a greater variety of pupil behaviors, allowed high school pupils to play a more active role in the classroom, did proportionately less talking thus permitting more pupil talk, and were less dominant and controlling in the classroom than the student teachers not trained in strategies.

Training in teaching strategies is not seen as a panacea for all the ills of teacher preparation. The training in strategies did little to help the trainees select relevant content to teach, for example.

This study needs to be repeated. Several factors may have influenced the outcomes. The variation in the number of tape recordings made needs to be controlled. The order of the training may have influenced the results because of communication leakage between the two groups and the resulting expectations aroused in the trainees. In repeating the experiment the order should be reversed, i.e., offer the eclectic training first, followed by the didactic training. The efficacy of training in teaching strategies cannot really be determined until it is offered in place of the traditional methods course. It may also be feasible to use other trainees as supervisors for microteaching

sessions as Wood has done to reduce the demands on the department's resources.[27]

The study also needs to be continued over time. Do the training effects wash out or do first-year teachers who were trained in strategies continue to exhibit a greater variety of strategies.

It was the investigator's expectation that the eclectic training would be more effective than the didactic. The evidence did not support this. It would be worthwhile to repeat the experiment to determine if the classes were really homogeneous and to try to isolate other variables that may have influenced the results. The question can also be raised regarding the influence of the cooperating teacher. If she had also been trained in the use of strategies the results might have been different. It is, of course, possible that the results could be accounted for solely on the basis of the Hawthorne effect. Repeating the experiment could assist in answering that important question.

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[27] C. C. Wood & R. L. Hedley, A laboratory in communication skills, paper read at Biennial Meeting of Canadian University Teachers of Home Economics, Winnipeg, Manitoba, June 1971.

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APPENDIX

Adaptation of Joyce Manual for Analyzing The Oral Communications of Teachers

The S-1 Sanctioning search behavior category was divided into two categories, S-1 and S-a (S-a being a new, additional category). The S-1 category was retained as "sanctioning search behavior" and the S-a category designated as "sanctioning student self-expression." The explanation of the change follows.

S-a: Sanctioning student self-expression. The behavior being rewarded or punished is the student's attempt to express himself, in literature, art, or opinion. The student is expressing himself, and the self-expression is being sanctioned. This self-expression often takes the form of relating personal experiences. This category (S-a) has been added to correspond to the I-2 category of handling information. The S-1 category is thus reserved solely for the sanctioning of search behavior and now corresponds more directly with the I-1 category. Examples:

T: Do you think spanking is a desirable form of discipline in this instance? (I-2)

S: Well, it seems to me he really needed to be spanked, but good. (R-1)

T: Hmm, hmm. (Teachers often use "comments" of this type that allow or encourage the student to express his ideas.) (S-a)

S: I remember I didn't like being spanked and I don't think you need to spank. (R-1)

T: It has probably happened to all of us, hasn't it? (S-a)

Modification of Joyce System for Coding Student Behaviors

Since the basic system codes only teacher behaviors the following categories have been added in order to allow for the coding of student behaviors.

Communications by students are coded by placing them in one of two categories for student communications:

R Student response to teacher
U Unsolicited or student initiated

STUDENT RESPONSE

The teacher solicits a response from the student by asking a question, calling on him by name, or otherwise indicating she intends a reply. The student's response to the teacher's solicitation is coded as R. The subcategory numbers (1, 3, 5) indicate the kind of response the student gives. These subcategory numbers correspond to the Information subcategories of the teacher's communications.

R-1: Student original response. The R-1 category is used to indicate a student's "original" contribution in response to the teacher's solicitation. This is a creative cognitive contribution that is relevant to the topic or solicitation at hand. It includes a student's giving perceptions, opinions, expressing preferences, raising hypotheses, and making inferences. It tends to occur with teacher behaviors of I-1, I-2, P-1, and P-2. Examples:

T: What do you think about Susy's (character in case study) decision to go steady? (I-2)

S: It seems to me she is sacrificing some of the things she said she valued, such as independence, in making that decision. (R-1)

R-3: Student pre-structured response. The R-3 category is used to indicate student's "pre-structured" contribution that follows along some pre-established line of thinking in response to the teacher's solicitation. It usually occurs following the I-3 teacher behavior. The teacher is looking for certain pre-specified responses and the student supplies them. They may or may not be "correct" or what the teacher is looking for. This student behavior shows no real originality, creativity, or discretional activity on the part of the student. Examples:

T: What are the four types of salad? (I-3)
S: Appetizer, accompaniment, main dish, and dessert. (R-3)
T: That's right. (S-3)

R-5: Student irrelevant response. The R-5 category indicates a contextually irrelevant response following a solicitation by the teacher. These are student responses that digress from what is going on at the moment in the classroom. It is a miscellaneous "catch-all" category for student responses that are not relevant to the solicitation. Examples:

T: Who can give me an example of a main dish salad? (I-3)
S: I don't like salads. (R-5)

UNSOLICITED OR STUDENT INITIATED BEHAVIOR

When the student initiates talk with is not solicited by the teacher it is coded as U. This category includes student behavior that

is not in response to any solicitation by the teacher. The U category includes student questions relating to procedures, routines, or content as well as student statements. The symbol U is used to designate any unsolicited student statement. Subcategories of U relate to other categories in the basic system. Context of the unsolicited comment as well as its content is considered in coding.

U-P: Unsolicited comment relating to procedure. The category of U-P is used to code student unsolicited comments or unsolicited student questions that relate to routines and/or procedures. This category relates to the P categories of the basic system. Examples:

I think we should check the plan now.
What page is it?
What did you say?
I don't understand the assignment.
Let's get out early today.

U-S: Unsolicited sanctioning comments. The U-S category is used to code student unsolicited comments that are of a rewarding or sanctioning nature. As with teacher sanctioning statements they may have a positive or negative connotation. Examples:

My, your dress is pretty (to teacher or another student). (U-S+)
You sure are a dumb teacher. (U-S-)

U-I: Unsolicited comments pertaining to information. This category is used to designate student unsolicited comments related to the content or information of the lesson. Student responses to comments made by other students dealing with content (no intervening solicitations by the teacher) are categorized here. Student comments relative to information must, however, be unsolicited by the teacher and must be relevant. Student unsolicited comments are more likely to occur following teacher I-1 and I-2 communications. They may not occur following teacher I-3 communications as these are solicitations for pre-structured student responses (R-3). In a true discussion (one that meets the criteria for discussion, rather than recitation) instances of unsolicited student remarks are quite frequent. Examples:

T: While walking to school today I observed two three-year olds playing on the sidewalk. (I-4) One child's dress was tattered and dirty. (I-4) The other child was neat and clean. (I-4) And so early in the day, too. (I-5)*
S: Some children start out the day dirty. (U-I)
S2: But some children just get dirty faster than others. (U-I)

*If the teacher had continued by saying, "What do you think about children being dirty while playing?" or some such remark, the student comments would have been coded as R-I rather than as U-I.

T: What do we mean by growth patterns? (I-3)
S: It's a general trend -- the way growth takes place. (R-3)
S2: A pattern fluctuates, has ups and downs. (R-3)
S3: And pleateaus, too. (R-3)

NOTE: In the above example, these are not unsolicited comments but rather several students responding to the same teacher solicitation.

U-5: Unsolicited irrelevant student comments. Irrelevant student comments are coded as U-5. This category differs from R-5 in that U-5 are unsolicited while R-5 are irrelevant comments in response to teacher solicitation.

/?/ Inaudible student response. The symbol /?/ is used for inaudible student responses.