

## DOCUMENT RESUME

ED 079 174

SO 005 830

AUTHOR Merwin, William C.  
TITLE The Use of Competency-Based Modules in Training Social Studies Teachers.  
PUB DATE Mar 73  
NOTE 19p.; Paper presented to the Annual Meeting, American Educational Research Association (New Orleans, February 25-March 1, 1973)

EDRS PRICE MF-\$0.65 HC-\$3.29  
DESCRIPTORS \*Autoinstructional Aids; Bibliographic Citations; Cognitive Development; Educational Research; Evaluation; \*Instructional Improvement; Methods Courses; Professional Training; \*Questioning Techniques; Secondary Grades; \*Social Studies; Speeches; \*Teacher Education; Teaching Methods; Teaching Techniques; Testing  
IDENTIFIERS \*American Educational Research Association

## ABSTRACT

The purpose of this study was to investigate the effectiveness of a series of self-instructional modules (SIMs) for training secondary-level social studies teacher-trainees to develop and ask higher-level questions. Forty subjects enrolled for social studies methods courses were blocked on pre-test scores and randomly assigned to treatment groups. The experimental group treatment consisted of using only four SIMs for six weeks. Three control group instructors employed conventional classroom instructional techniques. The data indicate that the experimental group achieved significantly higher achievement test scores and student teaching performance ratings. Additionally, the experimental group expressed favorable attitudes toward the use of the SIMs. Based on this data, the use of SIMs appears to be superior to more conventional instructional methods for developing concepts and skills essential to instruction for higher cognitive processes. (Author)

ED 079174

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THE USE OF COMPETENCY-BASED MODULES IN  
TRAINING SOCIAL STUDIES TEACHERS

A Research Report Presented  
to the

American Educational Research Association Convention

In

New Orleans

On

February 25 - March 1

By

William C. Merwin  
College of Education  
University of Wisconsin--La Crosse

SP005830

THE USE OF SELF-INSTRUCTIONAL MODULES IN THE TRAINING  
OF SOCIAL STUDIES TEACHERS TO EMPLOY HIGHER  
COGNITIVE LEVEL QUESTIONING STRATEGIES

Since the days of Socrates and perhaps even earlier, teachers have advocated the use of questions to promote thinking among their pupils. However, a review of research literature spanning the last six decades reveals that comparatively few teachers have systematically employed questions that require students to utilize higher cognitive processes (8, 1, 2). Thus, while teachers' questions may possess the potential for initiating critical and divergent thinking, all too often they focus on only the level of rote memory thinking. Even in the social studies classroom, where traditionally questioning has been employed extensively, the data reveal a similar pattern of predominating emphasis on the memory-comprehension level (6).

Conversely, several recent and current trends in curriculum development and school organization have accentuated the need for teacher proficiency in the skills of questioning. Many of the social studies curriculum projects of the 1960's, for example, emphasized the teachers' role in leading students to hypothesize, analyze data, group, categorize, compare, contrast, generalize, distinguish fact and opinion, clarify value positions and so forth. More recently, interest in the open classroom concept has underscored the need for teacher questioning proficiency in fostering the student's thinking processes.

As the need for such teacher skills has become more publicized, various advocates proposed or refined earlier models

for conceptualizing the thinking process and proposed means for training teachers to stimulate student independent thought. Several, including especially Norris Sanders (16), drew heavily on the work of Bloom and his colleagues (4) while others such as Hilda Taba (19) and Theodore Parsons (15) employed other schema.

In the wake of advocacy came a number of research studies reporting the results of various attempts to train teachers in systematic questioning strategies at both the pre-service and in-service levels (10, 3, 23). But little application of auto-instructional materials and techniques has been made to training social studies teachers in methods of systematic questioning for higher levels of cognitive learning (17, 10, 3, 13) despite the apparent efficacy of autoinstructional techniques for developing other skills required by teachers (11, 22, 5).

### Problem

This study sought to ascertain the effects of specially designed self-instructional modules (SIMs) upon the preparation of secondary-level social studies teacher-trainees. More specifically, it sought to determine the effectiveness of these modules in aiding pre-service teachers:

- 1) to acquire knowledge and develop skills essential to planning, questioning, and testing for higher cognitive processes; and
- 2) to apply their knowledge and skills as student teachers in planning, questioning, and testing for higher cognitive processes.

Additionally, the study attempted to determine the attitude of the teacher-trainee toward the concept of self-instructional modules.

### Self-Instructional Modules (SIMs)

The SIMs developed for this study are sequentially arranged units of expository instruction which consist of performance objectives, textual materials and mastery tests. Each SIM, approximately fifty typewritten pages in length, is self-paced and sequenced to permit the teacher-trainee to achieve an independent mastery of each teaching skill and concept. In order to achieve an independent mastery level, the teacher-trainee usually spends from three-to-five hours on each SIM.

The four SIMs developed for this study are:

- 1) "Formulating Questions to Achieve Selected Cognitive Objectives: An Adaptation of Bloom's Taxonomy";
- 2) "Questioning Strategies for Class Discussions";
- 3) "Planning for Instruction";
- 4) "Evaluating Student Learning: Testing."

Each of the SIMs focus on developing mastery performances in planning, questioning, and testing for higher cognitive processes. Thus, the SIMs employed in this study are designed to improve several phases of the teacher-trainees' questioning performance.

### Subjects

The sample consisted of forty teacher-trainees enrolled in three sections of a university-level social studies methods course during the winter quarter, 1972. Twenty-seven of the subjects were history majors, nine were sociology majors and the remaining four had majors representative of other social sciences. This sample had a cumulative grade point average of 2.84 on a four point scale.



At the first class meeting each teacher-trainee completed a seventy-item, multiple-choice pre-test designed to measure his knowledge in relation to the instructional objectives for the first half of the treatment period. Based on pre-test score equivalence, the subjects were blocked into twenty pairs and randomly assigned to treatment groups. Thirty of the subjects who completed the treatments enrolled for the student teaching course the following quarter, sixteen members of the experimental group and fourteen members of the control group.

The mean cumulative grade point average for the experimental group was 2.80 and 2.88 for the control group. The mean score on the pre-test was 36.5 for the experimental group and 37.1 for the control group. Although initial inequalities between the groups appeared to be small, an analysis of covariance was computed to ascertain the exact effects of these variables on the posttest scores. According to the analysis of variance data, the adjusted posttest scores were not significantly different from the unadjusted posttest scores. These adjusted posttest scores were not used in any further analyses of data.

#### Treatment Procedures

The experimental group received the four SIMs in lieu of conventional classroom instruction during the treatment period. There were no scheduled class meetings for this experimental group during the six week session. The subjects' progress was evaluated by their performance on written examinations, micro-teaching presentations, teaching plans, and teacher-made tests. The teacher-trainees were at liberty to take the examination and submit the plans and tests at anytime prior to the mid-term examination.

During the entire treatment time, the investigator spent less than eight hours in individual student conferences and in administering, scoring, and analyzing the examinations. Well over half of the problems experienced by the experimental group subjects dealt with the selection of a topic and materials for the teaching plans.

The control group treatment consisted mainly of lectures and demonstration lessons by the instructor and open discussions and micro-teaching by the teacher-trainees. The subjects were required to submit teaching plans and teacher-made-tests in addition to required text and other reading assignments which paralleled the material covered in the SIMs. While each of the three instructors employed slightly different teaching styles and instructional techniques, the control group sections were consciously prepared to meet the same performance criteria (mid-term examination) as the experimental group.

#### Evaluation Instruments

The investigator and three regular instructors agreed to a set of instructional objectives and related test-items for the first half of the quarter. The mid-term achievement test (posttest), designed by the investigator and approved by the other instructors, provided a criterion measure to assess the teacher-trainee achievement on these objectives. The test, consisting of seventy, four-option, multiple-choice items, was used both as a pre-test and posttest. In an effort to secure data relating to each of the SIMs, the test was divided into four subtests during the analysis. Additionally, the instrument was pilot-tested during the fall quarter and subsequently

analyzed by the (TSSA) Test Scorer, and Statistical Analysis (21) computer program which provided evidence for revision and/or elimination of dysfunctional items.

The posttest was administered in the form of a mid-term examination to both the experimental and control groups who had reassembled in their regularly scheduled classes for this purpose. The test was scored and analyzed by the TSSA (21) computer program which provided various test statistics and item analysis information. Means, standard deviations, standard errors of measurements and the Kuder-Richardson Reliability Formula 20 (12) for each subtest and the composite posttest achievement test are shown in Table 1.

Table 1. Means, Standard Deviations, Standard Errors, and Reliability Coefficients for the Posttest--Mid-Term Achievement Test

	SIM #1	SIM #2	SIM #3	SIM #4	COMPOSITE TEST
Mean Score	24.16	10.66	6.93	12.68	54.43
Standard Deviation	5.43	2.05	1.77	1.79	8.27
Standard Error	.82	.31	.27	.27	1.25
Reliability	.84	.58	.53	.34	.86

The relatively high (.86) reliability coefficient of the posttest was an empirically important indicator of the tests' quality. In fact, it is likely the most revealing statistical index of an achievement tests' quality (8).

The Cognitive Quality Rating System, designed by the investigator for this study, was adapted directly from two other



observation instruments: "The Questioning Strategies Observation System" developed by Morse and Davis (14), and "The Florida Taxonomy of Cognitive Behavior" written by Webb, Ober, Soar, and Brown (20). While both of the foregoing instruments possess credible validity and reliability, they both went beyond the needs of this study. Hence, only the cognitive quality formula employed in those observation systems was adapted for this study.

The Cognitive Quality Rating System provides a framework for observing and recording the cognitive behaviors of student teachers. The system was employed by two observers to assess the cognitive level of instruction of student teachers who were involved in this study. More specifically, the student teachers submitted three unit plans, three tests, and three audio-tape recordings of a ten-to-twenty minute class discussion, which represented the beginning, intermediate and terminal phases of their student teaching experience. All of these materials were classified according to Bloom's Taxonomy (4) to determine the cognitive quality of their instruction by the investigator and one other graduate student trained for that purpose.

To measure the cognitive quality variable in teaching plans, questions employed for class discussions, and test-items, the raters classified each event according to the appropriate taxonomy category. Then weights were assigned to the six cognitive categories: "Knowledge" = 1; "Comprehension" = 2; "Application" = 3; "Analysis" = 4; "Synthesis" = 5; and "Evaluation" = 6. The frequency of events in a category were multiplied by its weight. All resulting products were summed and an arithmetic mean was calculated. The resulting mean was taken as the score for cognitive quality (14).

Two raters were trained to classify and code cognitive behavior by using SIM #1. In addition to this SIM, the raters practiced classifying data from audio-tapes, unit plans and teacher-made tests submitted by students enrolled for other social studies methods courses. After approximately thirty hours of practice over a four-week period, the raters independently classified and coded sixteen, ten-minute class discussion tapes, ten unit plans, and ten teacher-made tests. This final exercise was to determine the reliability of the coders.

Using an Intraclass Correlation Formula developed by Ebel (7), reliability coefficients between the raters were computed: tape class discussions = .98, teacher-made tests = .90, and teaching plans = .87. This was determined as a satisfactory level of rater agreement and they then undertook the task of coding the materials submitted by the student teachers. All of the materials were coded by each rater independently. Infrequent rater disagreement on categories were resolved most often by discussion-compromise or less often by averaging the two category values.

A Student Evaluation Form was constructed by the investigators to record the opinions of the experimental group concerning their experiences with the SIMs. This information was secured by distributing a questionnaire to members of the experimental group following their completion of the mid-term achievement test. Students were requested to complete the evaluation form frankly and honestly. So that responses would be anonymous, signatures or other means of identification were omitted from the form.

### Analysis and Findings

To test the research hypotheses, an analysis of variance was calculated. The findings are reported in terms of main treatment effects. The null hypothesis is rejected if the probability of a Type I error was equal to or less than .05 (9).

The findings for the study's hypothesis regarding posttest achievement scores are illustrated in Table 2 for both the composite mid-term examination and the four subtests. Each subtest corresponds with a single SIM and related social studies methods course objectives. The table presents the composite test means and subtest means for the control and experimental groups in addition to the summaries of the analyses of variance.

Table 2. Achievement Posttest Means for the Control and Experimental Groups and Summaries of the Analyses of Variance

Criterion	Treatment Group		Summary: Analyses of Variance	
	Control	Experimental	F Ratio (1, 19)	Signif. Levels
Composite Test	48.60	60.30	87.75	.001
Subtests (SIMs)				
#1 Bloom's Taxonomy	20.80	27.50	117.69	.001
#2 Questioning	9.60	11.50	5.47	.05
#3 Planning	6.20	7.70	10.96	.01
#4 Testing	12.00	13.52	12.16	.01

The data indicated that there were statistically significant differences between the control and experimental groups on each of the four subtests. It can be inferred on the basis of this analysis

that within the limitations to internal validity, the use of the SIMs may have had a statistically significant effect on the post-test achievement of the experimental group. However, the Hawthorne effect must be considered as a possible rival hypothesis for the observed differences on the posttest. The subjects in both treatment groups were informed that they were involved in an experiment during the first half of the quarter. The exact effects of this information upon the subjects' achievement cannot be isolated, but the existence of these effects must be recognized.

The findings for the hypothesis related to the cognitive quality of instruction during student teaching are presented in Table 3. The data are divided to reflect the findings for each of three dependent variables in addition to a composite measure. Individual criterion (discussions, plans, and tests) correspond to particular SIMs. The table presents separate criterion means and composite means for both the experimental and control groups in addition to summaries of the analyses of variance. These means are based on a six point scale derived from Bloom's Taxonomy (4), and each mean represents three observations.

The data reveal statistically significant differences favoring the experimental group on each of the three dependent variables related to the cognitive quality of the student teachers' instruction. The experimental group instruction, using the self-instructional modules, may have been more effective than the control group instruction which used more conventional classroom methods. Again, it is possible that the novelty of the SIMs may have produced the effects attributed to the treatment.

However, the Hawthorne effect is unlikely to have influenced the teaching performance of the student teachers for two reasons:

- 1) length of time between completion of the treatment and commencement of student teaching performance evaluation (nine weeks); and
- 2) likelihood of an offsetting novelty effect produced by student teaching itself.

Table 3. Cognitive Quality Rating Means for Control and Experimental Groups and Summaries of Analysis of Variance.

Criterion	Treatment Group		Summary: Analyses of Variance	
	Control	Experimental	F Ratio (1, 19)	Signif. Levels
Composite Rating	1.89	2.44	8.73	.05
Class Discussion	2.01	2.56	17.88	.001
Teaching Plans	1.93	2.61	9.42	.01
Teacher-Made-Tests	1.72	2.15	4.79	.05

Information regarding student opinions was secured by administering a Student Evaluation Form to members of the experimental group. These data reveal that teacher-trainees using SIMs in lieu of conventional classroom instruction held a generally favorable attitude toward the use of autoinstructional techniques. This group found the modules to be an enjoyable and effective device for developing understandings and skills in planning, questioning and testing. A further indication of the experimental groups' attitude toward the SIMs is reflected in their desire to increase the utilization of this device in the methods course. Although no hard data were collected to



substantiate this, the researchers caution that more extensive use of the SIMs, like other instructional techniques, may produce a decline in interest. The shortcomings discussed by the students are deemed to be weaknesses characteristic of a particular module rather than the method of self-instruction. Based on these data, the investigator would anticipate a generally favorable student reaction to future utilization of the SIMs.

### Conclusions and Implications

Given these findings several major implications for teacher education become apparent.

1. The development of self-instructional modules for specific courses or even significant proportions of teacher education programs could lead to more effective and efficient use of the instructor's time. College faculty and cooperating school personnel could gain valuable time to serve as diagnosticians, managers, catalysts, tutors, and leaders; and from the students' perspective, more individual help would be available and work completed as time and motivation make possible.

2. In recent years, experimentation with the teacher-training curriculum has suggested the possibility of offering education courses concomitantly with directed observation and other participation experiences in the public school setting. As the demand for more of these field-based teacher education programs grows and as evidence mounts indicating the desirability of such programs, teacher education institutions will come under more and more pressure to provide such experience. This in turn will create additional demands on faculty time and energies. The use

of SIMs appears to be one way to generate time to work with pre-service teachers as well as in-service teachers in planning appropriate practicum experiences for teacher-trainees while at the same time improving the potential performance of teacher-trainees.

3. With a few modifications the SIMs could be used to provide a variant approach to in-service teacher training. The nature of the self-instructional approach would be particularly practical for busy teachers who have not had the opportunity to receive this instruction in their earlier professional preparation.

4. The social studies methods course has traditionally been charged with the development of a very wide range of concepts, skills and attitudes. As a result, the course content has often become diffuse and dissipated. With the addition of SIMs, teacher-trainees could develop independent mastery of several essential teaching competencies, thereby leaving more class time for the promotion of those issues and activities that require more social and interpersonal interaction.

5. Widespread adaptation of SIMs within a particular teacher-training institution could provide curriculum standards for increased program uniformity based on the measurable behavior of the trainees. Using the instructional objectives of the modules as performance criteria, the teacher education institution could provide an element of assurance to the public schools concerning the relative proficiency of trainees prior to their engaging in student teaching or professional practice. Recently, this type of performance-based teacher-training program has

received a good deal of attention in educational literature. It is entirely possible that self-instructional modules could provide the instructional vehicle for a performance-based system.

### Summary

This study sought a resolution to a fundamental question in relation to the utilization of self-instructional modules (SIMs) for the social studies methods course. More specifically, this inquiry was devised to determine the effectiveness of four specially designed SIMs in preparing secondary-level social studies teacher-trainees to plan, question, and test for higher cognitive processes. Results of the study indicate that the SIMs do indeed make a significant difference in the teacher-trainee's achievement and subsequent application of certain basic teaching skills and concepts. Additionally, the findings indicate that the learning experience encountered with the use of SIMs can be satisfying and enjoyable for the learner.

This study has produced empirical evidence to substantiate hypotheses concerning the utilization of SIMs to improve the quality of teacher education programs and ultimately the effectiveness of teaching performance. However, it is but one technique; there may be many others equally suitable to the task. Thus, the findings of this study, though satisfying, must be viewed as only a beginning of efforts to seek ways to improve the quality of professional training for the social studies teacher through the use of SIMs.

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## ABSTRACT

The purpose of this study was to investigate the effectiveness of a series of self-instructional modules (SIMs) for training secondary-level social studies teacher-trainees to develop and ask higher-level questions. Forty subjects enrolled for social studies method courses were blocked on pre-test scores and randomly assigned to treatment groups. The experimental group treatment consisted of using only four SIMs for six weeks. Three control group instructors employed conventional classroom instructional techniques. The data indicate that the experimental group achieved significantly higher achievement test scores and student teaching performance ratings. Additionally, the experimental group expressed favorable attitudes toward the use of the SIMs. Based on this data, the use of SIMs appears to be superior to more conventional instructional methods for developing concepts and skills essential to instruction for higher cognitive processes.