A steady stream of studies and monographs on competency-based teacher education attests to the growing belief that teacher training can be significantly improved by redesigning programs to focus upon the principles and practices espoused by that curriculum design. Unfortunately, the implementation of these principles and practices most often terminates with the initial employment of the teacher. However, if the long-range goals of the competency-based model are to be attained, the program must be extended to include continuing training experiences which take place throughout the professional employment period.

Few would argue that the relative advantages offered to both teacher trainees and prospective employers in a preservice competency-based program are not transferable to in-service teacher education as well. Yet, as evidenced by a review of current literature in education, efforts to generate competency-based...
based in-service programs have been sporadic at best (2).

Reasons hypothesized for this lag between in-service and preservice teacher training are many and beyond the scope of this article. However, it is generally agreed that to implement a competency-based program, specially designed materials or modules are essential. Resource materials or learning modules to be considered for a competency-based program must include: (a) prespecified objectives (competencies), (b) techniques for assessing the achievement of those objectives, and (c) opportunities for decision making regarding training needs based on successful mastery of objectives.

Current literature abounds with references to competency-based (performance-oriented) teacher education programs which usually employ one or more of the variant forms of the self-instructional module. Whether these innovative programs use appellations such as: Wilkits, Unipacs, Learning Packets, LAPs, individual instructional kits, proficiency modules, self-instructional packages, or SIM's, the intention is the same—-independent study, auto-instruction, and individualized learning experiences for teacher trainees.

In a recent study conducted in Anne Arundel County, Maryland, two self-instructional modules (SIM's) were developed and field-tested with an in-service group of secondary-level social studies teachers. These specially designed SIM's were employed, in lieu of more conventional in-service training practices, to develop teacher competencies in employing questioning strategies that require students to utilize higher cognitive processes. Although similar SIM's were found to be effective in preservice training situations, this was a first attempt with an in-service group (5). This article reports a summary of that research study.

**Problem.** This study sought to determine the effectiveness of two SIM's in aiding in-service teachers to:

1. Acquire knowledge and develop skills essential to questioning for higher cognitive processes

2. Apply their knowledge and skills as classroom teachers to leading a class discussion focused on achieving higher cognitive objectives: in other words, to raise the cognitive quality of their class discussions.

Additionally, the study was designed to ascertain the attitudes of the classroom teacher toward the use of the SIM's as an alternate in-service technique.

**Subjects.** The sample consisted of 32 social studies teachers drawn at random from six junior high schools and two high schools in Anne Arundel County—Baltimore, Maryland. The number of years of teaching experience ranged from two to twenty years, with a mean of 6.7 years.

**The Experiment.** During the first month of the fall term each subject was requested to make a 15-minute audio tape recording of a teacher-directed class discussion. The subjects were informed that this was a part of an in-service training project. After the class discussions were recorded, the subjects completed a criterion-referenced pretest.

Following the pretest, each subject was given copies of the two SIM's and directed to complete the SIM's before taking the posttest. The subjects were informed that they could work at their own pace, although a deadline of one month was established. After taking the post-test, each subject was requested to make another 15-minute audio tape recording of a class discussion. In all, the experiment lasted for approximately two months, although the subjects reported spending an average of less than seven hours on the SIM's and taping.

**Evaluation Instruments.** A 50-item multiple choice test was employed for both pre- and post-testing as a criterion measure to assess the subjects' achievement on the SIM objectives. The test was scored and analyzed by the Test Scorer and Statistical Analysis (TSSA) computer program (6) which provided various test statistics and item analysis information. The relatively high (.86) reliability coefficient of the post-test was an empirically important indicator of the tests' quality (4).
A Cognitive Quality Rating System was devised to evaluate the tape-recorded class discussion. This specially designed system provided a framework for observing and recording the questioning strategies used by the subjects. Each teacher question was classified and coded according to Bloom's taxonomy (1) by four trained observers to determine the cognitive quality of the instruction. Prior to analyses of these data the observers achieved an inter-rater reliability coefficient of .92 (3).

A Teacher-Trainee Evaluation Questionnaire was constructed by the investigator to record the opinions of the subjects concerning their experiences with the SIMs. This information was secured by distributing the questionnaire to the subjects after they had submitted their post-tapes. Subjects were requested to complete the evaluation form frankly and honestly. So that the responses would be anonymous, signatures or other means of identification were omitted from the form.

Analysis and Findings. To test the research hypothesis that the SIMs are an effective in-service training technique, a t-test for correlated means (repeated performance) was calculated between the pre- and post-test scores. Results for the pre- and post-test are depicted in Table 1.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>S.D.</th>
<th>Mean</th>
<th>S.D.</th>
<th>Difference</th>
<th>t</th>
<th>DF</th>
<th>Level</th>
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<tbody>
<tr>
<td>Pretest</td>
<td>24.03</td>
<td>5.262</td>
<td>35.81</td>
<td>6.76</td>
<td>-11.78</td>
<td>-10.32</td>
<td>21</td>
<td>.00001</td>
</tr>
</tbody>
</table>

Table 1. SIM Pre- and Post-Test Results

The data indicated that there were statistically significant differences between the pre- and post-test scores achieved by the teacher trainees. It can be inferred on the basis of this analysis that within the limitations of internal validity, the use of the SIMs may have had a statistically significant effect on the post-test scores. According to probability theory, a t value significant at .00001 can occur by chance only once in 100,000.

However, the effects of testing must be considered as a possible rival hypothesis for the observed differences on the post-test. The time span between the pretest and the post-test was less than three weeks in many instances; thus the differences observed on the post-test could be due to the effects of the relatively recent pretesting. The exact effects of this information upon the subjects' scores need further investigation.

A Call for Papers for the “Research Supplement”

Manuscripts are now being accepted for consideration for the "Research Supplement." The "Research Supplement" is not designed for publishing reviews of research issues, calls for needed research analysis, or analysis of widely quoted research studies. It has been established for the reporting of data. Criteria for selecting articles include:

1. The manuscript must report data. Included in the article must be some evidence to support the reliability of the measures used in the study.

2. The article should concern itself with the behavior of teachers (or their surrogates) and that of students as dependent variables. Behavior is taken to mean achievement scores, responses to questionnaires, etc.

3. The article should present a discussion of the results in such a manner that the meaning of the research is clear to readers. Some suggestions to meet this criterion include: a discussion of threats to the validity of the study's conclusion; an unambiguous definition of the independent variable; a distinction between the findings (data) of a study and the conclusion pertaining to the research hypotheses; a distinction between testing research hypotheses grounded in theoretical frameworks and answering research questions for which there exists no known theoretical base; and finally establishment of a basis for qualified conclusions.

Authors should send manuscripts to: Robert R. Leeper, Editor, Educational Leadership, 1201 Sixteenth St., N.W., Washington, D.C. 20036.

Manuscripts to be considered should be from 500 to 2,000 words, typed double-spaced. Submit original manuscript and three copies, and enclose return envelope and postage. All manuscripts will be submitted to an advisory panel, and prompt decisions will be made regarding their publication.
achievement cannot be isolated, but the existence of these effects must be recognized.

The findings for the hypothesis related to the cognitive quality of questioning strategies are presented in Table 2. The means are based on a six-point scale derived from Bloom's taxonomy (1). 

<table>
<thead>
<tr>
<th>Pre-Tape</th>
<th>Post-Tape</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td>2.658</td>
<td>3.145</td>
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</table>

Table 2. Pre- and Post-Tapes: Cognitive Quality of Questions Data

The data reveal statistically significant differences between the subjects' first audio tape and the tape recorded following instruction with the SIM's. According to probability theory, a t value significant at .0001 can occur by chance once in 10,000. The chance of obtaining such t values is very slim indeed; a high level of confidence that gains which were obtained resulted from the SIM's is warranted.

Information regarding the teacher trainees' opinions was secured by administering a questionnaire form to the subjects. These data reveal that the teacher trainees held a generally favorable attitude toward the use of SIM's as an in-service training device. For example, 75 percent of the subjects indicated that the SIM's were more effective when compared with other in-service training programs. Additionally, the subjects reportedly found the SIM's to be an enjoyable and efficient method for developing competency in questioning strategies. A further indication of the teachers' attitude toward the SIM's is reflected in their desire to increase the utilization of this device for in-service training.

Conclusions and Implications. Perhaps the most significant implication of these data is the most obvious: that the SIM's can be used with reasonable certitude to provide an effective alternative to more traditional in-service teacher training. The self-paced format of the SIM's appears to be particularly practical for busy teachers who need work in developing additional professional competencies beyond those learned in earlier professional preparation. Additionally, as other critical teaching competencies are transformed into training modules such as the SIM's, the special needs and unique interests of educators can be served, thereby creating a more personalized, dynamic in-service program. Thus, it would appear that when appropriate training materials are utilized, the principles and practices of competency-based teacher education can be successfully employed for in-service education.

This study has produced empirical evidence to substantiate hypotheses concerning the utilization of SIM's to improve the quality of in-service 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 teaching performance.

References


