

THE DEVELOPMENT OF A TECHNIQUE TO EXAMINE
THE CONGRUENCE BETWEEN INSTRUCTIONAL
OBJECTIVES AND QUESTIONS PLANNED BY
SOCIAL STUDIES STUDENT TEACHERS,

by

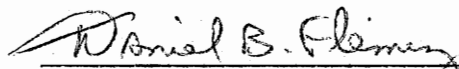
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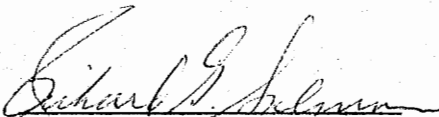
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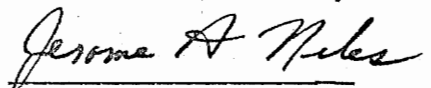
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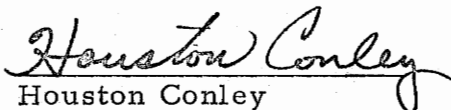
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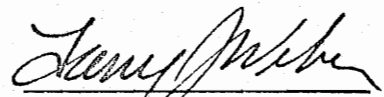
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Chapter I

THE PROBLEM

INTRODUCTION

Much of the emphasis in current educational thought is on the importance of the role of the teacher in facilitating the thinking and decision-making abilities of students. Questioning is probably the technique most often used by teachers to motivate students, to stimulate student thinking and to determine student achievement (Clegg, 1971). The nature of the teacher's questions can determine the level of thought reached during the lesson. Taba saw the act of asking questions as assuming a crucial role in teaching strategies.

Instead of teaching consisting primarily of communication of information with the role of the teacher as a fount of that information, he needs to become an adroit guide of the heuristic process. (1965:538)

However, an accumulated amount of evidence exists which suggests that teachers are not employing a full range of possible questioning strategies. The research indicates that teachers for over fifty years have tended to use those questions which demand primarily the learning and recalling of facts (Gall, 1970). If this

is the case, then the objectives which teachers have established for instruction must also be considered. For example, are the teachers' objectives stated at high levels while the questions they ask require only a recall of previously learned responses?

PURPOSE

The purpose of this study was to develop and implement a technique which examines the congruency between the stated objectives, the oral questions planned to stimulate discussion and the written examination questions developed by social studies student teachers.

An ancillary purpose was to design a technique which can be easily used by the classroom teacher who is interested in examining the congruency between his objectives and questions.

NEED FOR THE STUDY

Research in the area of questioning practices and the objectives they reflect has received a great deal of emphasis. Tinsley and Davis (1971) found that memory or acquisition of knowledge was the major cognitive objective revealed in the social studies classes of student teachers they studied. Similar findings indicated that memory was the most dominant thought process expected for teachers and students in social studies classes.

(Galloway and Michelson, 1973).

Textual materials have been examined for the kinds of thinking called for in activities and questions. In a study of thinking processes required by textbooks, the vast majority of social studies texts that were examined emphasized acquisition of knowledge previously presented in the book's narrative (Davis and Hunkins, 1966). Other studies have similar results. American history textbooks surveyed by Wadleigh (1969) did not provide a range of questions which elicit all categories of thinking skills. Rogers (1973) surveyed and analyzed questions in social studies textbooks used in grades four, five and six. He also found that most textbook questions were at the low cognitive levels.

Trachtenberg (1974) conducted a content analysis based on Bloom's Taxonomy of Educational Objectives of nine sets of widely used world history text materials to determine the range of thinking activities represented. He examined study questions, exercises, questions, suggested activities and test items and found a heavy concentration at the levels of knowledge and comprehension. In fact, over ninety-eight percent of the composite totals were at those two lowest categories.

Significant changes have been found in the objectives and strategies built into some current inquiry-oriented United States

history textbooks. The emphasis on inquiry instruction dictates an organization built around raw data and answering questions (Sanders, 1971). This could lead to the assumption that teachers using these materials and who follow the text's format are likely to use a variety of levels of questions. In fact, a study which examined the questioning practices of mathematics teachers suggested that teachers' use of lower and higher level questions depended on the types of curriculum material which were available to them (Sloan and Pate, 1966).

Teacher made examinations are the most predominant means of measuring the thinking and learning progress of the students, yet they still tend to require only lower order cognitive functions. Teacher made examinations were studied in civics and world history classes by Pfeiffer and Davis (1965). They found that the civics tests emphasized knowledge exclusively, and the world history tests emphasized knowledge sixty-two percent of the time. Tinsley and Davis (1971) found that student teachers planned questions for tests and classroom discussion in the eighth and eleventh grades with a dominant emphasis on memory and evaluation.

One of the major aims of social studies is to develop critical thinking which requires high levels of cognitive functioning. If questions planned and used by teachers for instruction and

evaluation can be significant in developing and measuring these cognitive powers of the students, then research which examines the basic function of established objectives is needed.

Bloom and others maintained that the formulation and utilization of educational objectives play a central role in the teaching and learning process, "We feel that once objectives are defined clearly, they can become models or plans that help shape and guide the instruction and evaluation process." (1971:21). Therefore, if instructional objectives provide a sound basis for teaching, then the questions used to facilitate and measure achievement should be congruent with the objectives.

However, Krathwohl noted the discrepancies often found between objectives and questions.

As might be expected, too frequently the balance between factual knowledge and the complex ways of thinking about and using it called for in the statement of objectives fails to appear when one examines items from the examination of the materials and nature of instruction. The heavy emphasis on memorizing knowledge is dramatized by a comparison of the proportionate use of the Knowledge category versus all the others combined. It is not unusual to find that the time spent on knowledge instruction on the items so categorized is 50 to 90 percent of the total. (1971:30).

The procedures or kinds of questions or activities used for evaluation purposes indicate to the pupils which goals are worth working toward and what behavior they need to attain these goals.

From the students' point of view, the evaluation procedures determine the real goals of instruction (Gronlund, 1966).

The study is specifically designed to explore the relationship between the objectives planned and subsequent questions planned by social studies student teachers for use in classroom discussion and in written examinations which measure the stated objectives. The technique developed to express the relationship accounts not only for the cognitive level of the objectives and questions - higher and lower - but also accounts for the value or weight placed by the student teacher on both objectives and questions. An indicator of each of these is incorporated into the measuring device, the Cognitive Index, used in this study.

Krathwohl substantiates the rationale for the inclusion of a value indicator in the analysis of objectives and questions:

... he [the teacher] will have to examine his set of test exercises to be sure that content and behavioral applications are covered in proportion to his intended emphasis. This is the beginning of a deliberate analytic approach to test building. (1971:20).

Data from this study should indicate if the social studies student teachers included in the study developed discussion and examination questions which were congruent with their stated objectives in terms of the weighted cognitive level. The resultant information could be useful to teacher educators, especially at the

institution in which the study was conducted, as they attempt to devise strategies to help pre-service teachers plan and use classroom questions which foster higher level thinking in students. On a more individual basis, the results could be used to help each student teacher analyze the congruency between his objectives and questions. The technique is also adaptable for use with in-service teachers for individual analysis or for group information.

BASIC ASSUMPTIONS

All the questions and objectives used in the study could be categorized into higher or lower cognitive levels.

All the student teachers perceived the use of at least two levels of objectives and questions as having an important place in social studies teaching techniques.

The various placements of the student teachers in high schools or junior high schools had no effect on the student teachers' ability to develop and implement different levels of objectives and questions.

LIMITATIONS

The sample was limited to those eleven social studies student teachers enrolled in EDCI 4750, Student Teaching, Spring Quarter,

1975, at Virginia Polytechnic Institute and State University.

The classes from which objectives, copies of daily lesson plans, and copies of examinations were obtained were from the unit of study designed by each student teacher which was part of the written requirements of student teaching.

There was no control over the textual and supplementary materials being used by the student teachers in terms of their organizational format, emphasis, or philosophical orientation.

The researcher could not control the variables of the individual characteristics of the students in the junior and senior high classes such as age, ability, prior knowledge, grade placement, attitudes and other subjects being taken.

DEFINITIONS

Cognitive Categories

In order to adequately describe the types of objectives planned and questions asked by teachers, researchers in past studies have had to quantify their descriptions. As a result, several classification systems have been developed. Some are based on Benjamin S. Bloom's Taxonomy of Educational Objectives

(1956) which was developed to classify educational objectives into cognitive categories as follows: knowledge; comprehension; application; analysis; synthesis; and evaluation. It has also served as a useful tool for the classification of objectives and tests items.

The Taxonomy also has been used in the analysis of examination and teaching practices to compare the emphasis given to various of its categories in the statements of course objectives with the emphasis on these same categories in analyses of the test question or of instruction. (Krathwohl, 1971:30)

Sanders (1966) adapted Bloom's categories for use in planning classroom questions. He developed a taxonomy of questions which expanded the comprehension category into two separate categories of translation and interpretation. He provided a definition of each category along with illustrated sample questions.

While some researchers have used Sanders' approach as a model in developing classification systems specifically applicable to their research (Davis and Tinsley, 1967), other researchers have based systems on Guilford's model of intellectual processes (1956). In Guilford's system the thinking factors are categorized into the headings of cognition or discovery, production which is convergent and divergent thinking, and evaluation.

Using Guilford's system as a model, Aschner and Gallagher (1963) devised a five-category system including: cognitive memory, convergent thinking, divergent thinking, evaluative thinking and routine. Tinsley (1968) also used Guilford's model as a guideline for a six-category scheme including: memory, convergent thinking, logical thinking, reflective thinking, divergent thinking, and evaluation. These systems have the feature of having a limited number of general categories which allows them to be used to classify questions irrespective of context.

Still other systems have been designed for specific curricula and provide more detailed descriptions of the questioning process. Clements (1964) developed a system suitable for art education. Lundsteen (1974) proposed a technique for use with creative problem solving in English.

To serve the purposes of this study it was decided to design a classification scheme which is broad enough to be applicable to the categorization of instructional objectives as well as oral classroom and examination questions. A classification scheme was devised which considers two levels - lower and higher - of cognitive functions. Bloom, while playing a major part in developing the Taxonomy of Educational Objectives based on six levels of

cognitive functioning, said that educational objectives guiding instruction can be divided basically into two parts. "One would be the simple behavior of remembering or recalling knowledge and the other, the more complex behaviors of the abilities and skills." (1956:28).

Justification for a two-category system includes evidence from past research. Findings from many studies substantiate the premise that most objectives and test questions can be classified at low levels while very few fall into the higher categories (Rogers, 1973, Tinsley, 1973, Krathwohl, 1971). Another consideration in the development of a two-category system for this study was the difficulty in distinguishing between the higher levels of thought being called for in questions. A concern in other studies has been whether a question is phrased so that it elicits lower level thinking or higher level thinking. Based on the above justification, the following definitions of objectives and questions were developed for the purpose of this study.

Higher Level Objectives - a written statement by the student-teacher of purpose and/or intended outcome guiding either a unit plan or a daily lesson plan which necessitates a cognitive process as comparing, contrasting, inferring, analyzing, evaluation, hypothesizing, generalizing, synthesizing and is above the memory,

recall or identification.

Lower Level Objectives - a written statement by the student teacher of purpose and/or intended outcome guiding either a unit plan or a daily lesson plan which requires the cognitive process of memory, recall or identification

Higher Level Questions - an interrogative statement which necessitates a pupil response requiring a cognitive process as comparing, contrasting, inferring, analyzing, evaluating, hypothesizing, generalizing or synthesizing.

Lower Level Questions - an interrogative statement which necessitates a pupil response requiring a cognitive process of memory, recall or identification.

Cognitive Index - the score used in this study which represents the respective cognitive level and weight of the objectives and questions.

A cognitive index was computed for each objective and question by multiplying its cognitive level times its weight score. The procedure is illustrated below.

$$\text{Cognitive Index} = \text{Cognitive Level} \times \text{Weight Score}$$

RESEARCH QUESTIONS

Using the technique developed by the researcher answers to the following research questions were sought:

1. What is the degree of congruence between the unit objectives student teachers develop to guide their classroom instruction and the unit test questions they design to measure those objectives?
2. What is the degree of congruence between the objectives from a specific daily lesson plan student teachers develop and the key oral questions they compose to guide the discussion in that lesson plan?
3. What is the degree of congruence in the unit plan as compared to the degree of congruence in a daily lesson plan?

ORGANIZATION OF THE STUDY

In Chapter 1 a brief introduction to the proposed research and a statement concerning the purpose of and need for the study is presented. Also included are basic assumptions, the definition of the terms used, the limitations and the research questions. Included in Chapter 2 is a review of the related literature with special emphasis on classifying and analyzing the question asking

practices of teachers, relating higher order questions to higher order learning and the proposed directions for future research.

A description of the research procedures is included in Chapter 3.

The data is analyzed and the results are discussed in Chapter 4.

Included in Chapter 5 is a summary, a discussion of the implications of the results of the study and recommendations for future research.

Chapter II

REVIEW OF THE LITERATURE

There has been a vast amount of research conducted in relation to classroom questioning practices. This obvious concern with teacher questions reinforces the notion that one of the major roles a teacher plays is to ask questions. The literature on questions and the objectives they reflect is reviewed and divided into the following discussions: a description of the foci of the major research which has been conducted and a justification of the need to change the direction of further research.

FOCUS OF MAJOR RESEARCH

Classifying and Analyzing Objectives and Questions

Classifying and analyzing the questions teachers ask remains as a vital part of the research on questioning. It is the first step in research and must be conducted logically and systematically. The work of Bloom and others (1956) in Taxonomy of Educational Objectives significantly contributed to the goal of developing precise definitions and classifications of thinking. They

divided cognitive functioning into: knowledge; comprehension; application; analysis; synthesis; and evaluation

These categories of the expected intended behavior, objectives, of the students led the way for researchers to examine the levels of objectives and methods of achieving and measuring those objectives. Sanders (1966) expanded on Bloom's work by adding another classification category and applying them to the questioning process. Aschner and Gallagher (1963) based a widely used categorical system of classroom questioning on Guilford's description of the operations of intellect.

The above three systems along with numerous variations of each provided the basic structure for much of the research on questioning. Among the various uses of the different classification systems has been classifying questions found in textual materials and in teacher-made tests. Even more research emphasis has been placed on classifying the oral questioning practices of teachers. Most of the studies conducted on oral questioning have been based on what Gall (1970) calls the cognitive-process approach. That is, the question is classified according to the type of cognitive process it appears is required to answer it.

Also, most of the studies have simply provided a tally of the number of questions in various categories and indicated those totals

or percentages as being representative of the teacher's questioning practices. Little or no consideration has been given to the value placed on a question by a teacher. The weight or credit allowed on a test question is an indication of the value the teacher places on that question. In only one study was attention given to the weight assigned to each test item. It was then transformed into percentages to indicate the proportion of time allotted by the teacher to each cognitive level (Billeh, 1974).

There is some merit to the argument that this kind of analysis does not consider the implication of other questioning patterns. Gall (1970) called for research in questioning which examines whether questions enable students to achieve the desired educational goals.

Relating Higher Order Teaching Techniques to Higher Level Student Achievement

Some empirical support has been found for the assumption that student achievement can be related to the cognitive level of teaching techniques and materials. Ryan (1973) had results which suggested that higher level teacher questions were more efficient than lower level questions for moving students toward both low and high level understandings. He later expanded this study to determine the effect of student involvement as manifested through

student responses solicited. He found that when multiple student responses were solicited, higher level questions as well as low level questions led to superior higher and lower achievement (1974).

Hunkins (1969) investigated whether a dominant use of evaluation and analysis questions in social studies materials would improve student achievement. Findings seemed to indicate that using high level questions did significantly improve pupils' ability to evaluate information. Also the high level questions fostered pupil's knowledge achievement as well as low level questions. The findings suggested that using high level questions should move students to be capable of doing something with the information which they have learned.

Becker (1971) found that biology student teachers trained in the use of higher level questions asked significantly more high level questions than a control group. However, the biology students in the control group tended to respond correctly with higher level answers to the higher level questions as often as the students in the treatment group. This is an indication that when students were given opportunities to think at higher levels, they did so, even though their teachers were not specifically trained in asking higher level questions.

In examining some relationship between the verbal cognitive behavior of teachers and the cognitive responses of students, Aschwald (1969) found that the cognitive verbal behavior of the teachers affected the students' responses significantly. Specifically, those teachers who spent a lesser rather than a greater amount of time in giving information obtained a greater number of self-initiated statements at a higher cognitive level.

The effect on pupil learning when teachers and textual materials stressed higher order learning but the examinations tested on lower order knowledge was studied by Cooper (1968). He found that the students who had material stressing higher order learning did not score higher on a common final examination containing both high and low level questions than the students who had worked with material stressing lower order materials. His results are restricted in applicability because of several factors which he felt accounted for the negative results. They include student boredom with the method of reading which was used for eight days, the students' inability to read well, the students had a set for studying for lower order examinations, or the tests might not have been difficult enough.

The investigation of the classroom questions of tenth and eleventh grade science, social studies, and English teachers to

determine if frequency and types of questions are related to a change in pupil critical thinking was undertaken by Cohen (1972). He found that the science teachers asked significantly more questions than social studies teachers but not more than English teachers. Also science teachers asked more translation questions than English and social studies, and more application questions than social studies. He discovered that there was no significant difference between the number of high level questions science and nonscience teachers asked and that there was no significant relationship in this study between high level teacher questions and student critical thinking ability as measured by the Cornell Critical Thinking Test.

Cole examined the relationship between the cognitive level of teachers' questions and cognitive level, length, and syntax of student responses. He concluded "that the cognitive level, length, and syntax of pupil responses are highly contingent upon the cognitive level of teacher questions." (1970:144)

Adams (1974) sought to provide empirical evidence to support or refute the assumption of inquiry teaching that a relationship exists between teachers' use of higher level questions and students' development of critical thinking. Her findings reveal a trend toward increased critical thinking among the classes in

which the teachers used higher level cognitive questions.

Some empirical support exists for the assumption that student achievement can be related to the level of teaching techniques and materials. Results are so varied, however, that no single method's results are generalizable. A need for additional specific research is indicated.

PROPOSED DIRECTION OF FURTHER RESEARCH

Research which explored the role of questioning beyond classifying and tallying has focused primarily on the relationship of higher order teaching techniques to higher level student achievement. A study of the pertinent research revealed that in only two cases were specific references made to the role of the objective in relation to questions used for evaluation (Billeh, 1974, Tinsley, 1967). Neither one of these studies claims to have explored the relationship of the stated instructional objectives to the questions for classroom use.

A movement does exist, however, which is based on the belief that tests should be specifically designed to measure instructional outcomes. It is called objectives-based evaluation. Bloom alluded to this kind of evaluation in his discussion of the Taxonomy of Educational Objectives.

Objectives are not only the goals toward which the curriculum is shaped and toward which instruction is guided, but they are also the goals that provide the detailed specification for the construction and use of evaluative techniques. (1956:27).

A currently popular concept in evaluation is Criterion-Referenced Testing. Glaser and Nitko's definition is not unlike Bloom's comments on objectives and evaluation.

A criterion-referenced test is one that is deliberately constructed to yield measurements that are directly interpretable in terms of specified performance standards. (1971:653).

Both imply that a test is adequate and valid if it provides evidence of the extent to which students have attained the stated objectives.

Glaser and Nitko further explain performance standards as being:

...generally specified by defining a class or domain of tasks that should be performed by the individual. Measurements are taken on representative samples of tasks drawn from the domain and such measurements are referenced directly to the domain for each individual measured. (1971: 653)

The use of such domain-referenced models of test development are gaining increased emphasis in the activities of evaluation (Millman, 1974, Baker, 1974). They go beyond simply comparing overt behavior in the test situation with the behavior called for in the objective (Baker, 1974). Yet, while still retaining the attribute of generalizability of knowledge within the domain,

domain-referenced evaluation can be interpreted as a score for an individual without reference to the performance of others.

Criterion-referenced testing is particularly suitable for evaluating certain instructional models such as Computer-Assisted Instruction and Individually Prescribed Instruction (Hambleton and Novick, 1973). But what of the average classroom teacher who cannot or does not wish to create a measurement technique for each instructional objective? Domain referencing could be the answer for it requires the objective-maker to focus on the range of eligible content to which the learner's skill is to apply (Baker, 1974).

But how can one discover whether or not he is operating within the objectives-based model? Roeder found in a national survey of teacher preparation institutions that there was an overwhelming lack of attention given to courses in evaluation.

Specifically, he found that

... many of the institutions which were surveyed reported that their graduates spent more time enrolled in courses devoted to art methods, music methods and physical education, than they spent enrolled in college classes which prepared them to use standardized informal evaluation instruments. (1975:142)

If Roeder's findings are accepted then few classroom teachers are really prepared to be effective evaluators of student performance. It naturally follows, then, that techniques adaptable

to the classroom situation should be available for determining the relationship of questions to goals. If teachers are consistently testing at lower levels there needs to be a technique available which will allow them to become aware of the level of the questions they use.

Ryan stated (1974) that the research available which has been confined to a consideration of the kinds of oral questions asked and their possible effects is too restrictive and limited in terms of inferences which might evolve from such data. Further investigations, according to Ryan, should focus on the entire learning environment including the roles and character of the teacher and the students. His findings of lower and higher achievement from lower and higher oral questions with the added variable of multiple student involvement suggested that teachers ought to carefully plan the questioning strategies sequence which should naturally flow from clearly defined, relevant objectives.

Sanders stated that higher level questions do not necessarily consistently lead to higher levels of learning without the teacher being aware of individual differences among students, of the affective climate of the classroom, and of his own teaching style. "The kind of research needed would determine the kinds of students, teachers, and classroom conditions that foster success with higher

level questions." (1972:275)

Using this kind of information, instead of just determining which questions teachers ask, educators should give more attention to the kinds of questions teachers should ask. This will require more specific attention to the definition of desirable educational objectives and the identification of questions and question sequences which will aid students in achieving those objectives (Gall, 1970).

The combinations of the assumptions that a teacher needs to first establish the level of thought to be reached by the student and then must design activities and key questions for accomplishing the goals are prerequisites for effective teaching and learning. Tinsley called for a better correlation of goals and practices, intent and action, because

...today's society, schools, and youth can no longer afford an educational system which continues to report that the questions it uses demand little more than recall of past knowledge by its students. (1973:713)

SUMMARY

On the basis of a review of the literature, three generalizations applicable to the proposed study were formulated:

1. Much of the classification and analysis of classroom questioning practices research has revealed an emphasis on lower

level questions;

2. Generally, the teacher's use of higher level questions moves students toward higher level learnings and understandings;

3. Future research on questioning should focus on the entire teaching and learning environment.

Chapter III

DESIGN OF THE STUDY

SAMPLE

The sample included eleven students enrolled in EDCI 4750, Student Teaching, Spring Quarter, 1975 at Virginia Polytechnic Institute and State University with a major in one area of social studies. All were placed in social studies classrooms for student teaching. Four were in junior high or middle schools while the remaining seven were placed in high schools.

All the subjects were seniors in college and completed requirements for graduation and teacher certification either at the conclusion of student teaching or within one quarter. All subjects completed the same social studies methods course the quarter prior to student teaching.

PROCEDURES

The procedures followed in the study were to design and then implement a technique which examined the congruency in terms of cognitive level and importance between the objectives

and questions planned by social studies student teachers.

Specifically, a macrocosmic view of congruency as well as a microcosmic view of congruency was desired. The macrocosmic view examined the congruency between the unit objectives and the examination questions which were designed to measure attainment of those objectives. For a microcosmic view, objectives from a daily lesson plan from the same unit were examined and compared for congruency with the key questions planned to guide discussion for that daily lesson plan. A comparison of the macrocosmic view and the microcosmic view was included in the design. The procedure is discussed first in terms of measurement and the relationship of the unit objectives to the unit examination, and then in reference to the measurement of the daily objectives to the key questions in that daily lesson plan.

Unit Objectives and Unit Examination Questions

Each student teacher was required to design and teach a number of units of study during the student teaching experience. One of these units of study by each student teacher was analyzed to determine the congruence between the unit objectives and the unit examination questions. Because of the diverse teaching assignments, no two units were based on the same content, nor

were they designed for the same grade or ability level. To provide some degree of standardization, several guidelines were provided for the student teachers to follow as they progressed in their planning. (See Appendix A)

The student teachers were asked to develop specific unit objectives for their respective units which were derived from the Social Studies Curriculum Guidelines developed by the National Council of the Social Studies (1971). The Guidelines encourage teachers to direct learning toward achieving the following abilities: thinking competencies; information processing skills; and social interaction and responsibilities.

In addition, each student teacher was asked to design a unit in which the unit examination would count at least fifty percent of the total unit grade. To insure that extraneous objectives and questions would not be included in the calculations, the student teachers were required to indicate which unit objectives were being evaluated by each test item with a cross reference notation. The unit objectives which were measured by evaluative devices other than the unit examination were not included in the data as were those test questions not matched to one of the unit objectives.

No determination was made of the student teachers' prior knowledge of levels of cognitive functioning. To familiarize them

with Bloom's categories a thirty minute presentation was made to them as a group during their second week of student teaching. The content was based on a modified version of Bloom's Taxonomy of Educational Objectives. (See Appendix B)

The weight or value characteristic of both the objectives and questions is a vital aspect of the technique used in this study. Theoretically, each objective should contribute to the students' total mastery of the unit, and each contains an inherent value. To obtain a measure of the value of objectives, the student teachers were asked to assign a numerical weight to each objective to indicate their perception of the degree of the importance of each to the students' total understanding of the unit.

The value assigned to an examination item by a teacher really reflects just how important he considers it to be. The maximum amount of credit a student can receive for correctly answering a question is often the true, most realistic value a teacher places on that question. Therefore, the weight or credit allowed which the student teacher assigned to each examination item was the measure of value used for the examination questions in this study.

The unit objectives were examined and categorized as either a lower level objective or a higher level objective.

Similarly, the items on the unit examination were also examined and categorized as either a lower level question or a higher level question. Two raters independently classified the objectives and questions using a modified version of the Taxonomy of Educational Objectives as a guide. (See Appendix B) The first effort at classification resulted in eighty-three percent agreement. The differences were then discussed by the two raters and resolved so that total agreement resulted.

Daily Objectives and Key Questions

A daily lesson from each student teacher was chosen to be analyzed. Each daily lesson plan was from the same unit of instruction from which the unit objectives and unit examination questions had been analyzed. Again each student teacher was asked to indicate his perception of the importance of each of his objectives for that day by assigning a numerical weight to each one in relation to its importance to the students' total understanding of that day's lesson.

Certain criteria were used in guiding the student teachers in their designing of adequate lesson plans. One area which received considerable attention was the inclusion of oral key questions in lesson planning. In developing their lesson plans

which focused on the instructional technique of questions and answers, the student teachers were asked to give deliberate attention to developing key questions. Included in each written lesson plan were at least five key questions which were designed to be used to stimulate and guide class discussion.

Grant maintained that the teacher's greatest function within the classroom is in the verbal area and that key questions should be central to the plan.

For having decided on the book, the story, the page, the materials, the assignment . . . , the teacher's main task is still ahead - planning the activities of the lesson and creatively developing a potential sequence of key questions and verbal structures that indicate the way in which those activities will lead to student learning. (1967:508)

After deciding on the nature and sequence of the key questions, the student teachers were asked to indicate their perception of the importance of each key question to the student's total achievement of the day's objectives by giving each key question a numerical weight.

To be consistent with the treatment of the unit objectives and unit examination, the daily objectives and key questions were classified into higher or lower cognitive categories by two raters using the same procedures as described above which had been followed for the unit objectives and unit examination questions.

Measure

A unique feature of this study was the inclusion of consideration of the perceived importance or value of the objectives and questions planned and used by the student teacher as well as the cognitive level of the objectives and questions. The Cognitive Index, the measure used in this study, was specifically designed to reflect the cognitive level and the value of an objective or question. When the objectives and questions were categorized as lower cognitive or higher cognitive a corresponding number was assigned to each. A -1 was assigned to lower cognitive objectives and questions. A +1 was assigned to higher level cognitive objectives and questions. A hypothetical example follows which explains the procedure used for objectives.

<u>Objective</u>	<u>Weight (value assigned by teacher)</u>	<u>Cognitive Category</u>
1	10	+1
2	25	-1
3	<u>15</u>	+1
	50	

To normalize the scores the following steps were employed. To obtain a weight score for each objective, the ratio of the weight

of an individual objective was divided by the sum of the weights of all the objectives. This always yielded a decimal number ranging from 0 to 1. This procedure is illustrated below:

$$\text{Weight Score} = \text{Objective Weight} \div \text{Total Weight of Objectives}$$

The previous example is expanded to illustrate the procedure.

<u>Objective</u>	<u>Weight</u>	<u>Cognitive Category</u>	<u>Weight Score</u>
1	10	+1	.20
2	25	-1	.50
3	<u>15</u>	+1	.30
	50		

The numerical representation of the cognitive levels, -1 or +1, for each objective was multiplied by the weight score of the objective. This provided the Cognitive Index which is the amount of emphasis given higher and lower level objectives.

Using the same example the procedure is illustrated further.

<u>Objective</u>	<u>Weight</u>	<u>Cognitive Category</u>	<u>Weight Score</u>	<u>Cognitive Index</u>	<u>Total Higher Level Cognitive Indices</u>	<u>Total Lower Level Cognitive Indices</u>
1	10	+1	.20	+.20	+.20	
2	25	-1	.50	-.50		-.50
3	<u>15</u>	+1	.30	+.30	<u>+.30</u>	<u> </u>
	50				+.50	-.50

Note that the emphasis can be discussed in terms of using higher level objectives or lower level objectives as a reference point. This is a totally arbitrary decision to be made by the user of the technique. The procedure yields a total of the emphasis on higher level objectives and a total of the emphasis on lower level objectives. Either of these totals can be used as a reference point for the purpose of discussion and further analyses. The Total Higher Level and Total Lower Level scales are mutually exclusive. Once the user chooses to operate in the positive scale or from the higher level reference point, he will not have any negative values. The reverse is true if the lower level is the reference point.

Conceivably there are valid instructional instances when the teacher is interested only in achieving and measuring lower level functions. When this is the case, he would probably choose

to operate from the lower level reference. There might also be situations in which just higher level functioning or a combination of higher and lower level functions are desired and the higher level reference would be more appropriate. Since it was assumed that the student teachers in this study perceived that both cognitive levels had a place in social studies, it was decided to use the higher level as a reference point.

A cognitive index was computed for each unit examination question in the same manner as the cognitive index for the unit objectives. The cognitive index computations are illustrated below.

<u>Question</u>	<u>Weight (credit)</u>	<u>Cognitive Category</u>	<u>Weight Score</u>	<u>Cognitive Index</u>	<u>Total Higher Level Cognitive Indices</u>	<u>Total Lower Level Cognitive Indices</u>
1	20	-1	.20	-.20		-.20
2	20	-1	.10	-.20		-.20
3	15	+1	.15	+.15	+.15	
4	10	+1	.10	+.10	+.10	
5	<u>35</u>	+1	.35	+.35	<u>+.35</u>	<u> </u>
	100				+.60	-.40

The technique was expanded so that each individual's scores could be examined in terms of the congruence between the

cognitive index of the unit objectives and the cognitive index of the unit examination questions. The degree of the congruence between the cognitive index for the daily lesson's objectives and the cognitive index for the oral key questions was also examined.

Based on the assumption that the objectives one sets are the ideal to strive toward, both the unit objectives and daily objectives were set as standards. The total of the cognitive indices of the unit objectives of each student teacher was subtracted from the total cognitive indices of the test questions to obtain a measure of the degree of macrocosmic congruency for each person. The same procedure was used to determine the degree of microcosmic congruency for each student teacher by subtracting the total of the cognitive indices of the daily objectives from the total of the cognitive indices of the oral key questions.

The difference score which resulted indicates the direction and degree of the deviation of the questions from the objectives. For example, a difference score of zero would show that the student teacher apportioned the same amount of weight to higher and lower levels in both the objectives and questions. A minus difference score would indicate that more value was placed on objectives at higher levels than on corresponding questions at higher levels. Similarly, a plus difference score would indicate

more value was placed on higher level questions than on corresponding objectives at the higher level.

The implementation of the technique yielded scores which were used as the basis of several comparisons. Two dimensions of congruency were examined. The magnitude or quantity of congruence or incongruence, and the directional degree or quality of the emphasis on either higher or lower levels were examined and discussed. The congruency of the unit objectives and unit examination questions was compared and discussed. Likewise, the congruency of the daily objectives and daily key questions was examined and discussed. Both the unit scores and daily scores were compared for the total group and for the groups broken down into junior high and senior high student teachers.

To develop the comparison further, the degree of congruence for the macrocosmic view was compared with the degree of congruence for the microcosmic view. That is, the difference scores for the unit planning and daily planning were compared and discussed.

Chapter IV

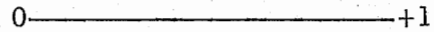
RESULTS

This study examined the congruency between the instructional objectives social studies student teachers established and the questions they planned and composed to guide class discussion and to use as examination items. Specifically, the perceived importance, weight score, and the cognitive nature or level of both the objectives and questions were focal points in the analysis. An attempt was made to develop a technique which could be used and understood by any classroom teacher who is interested in comparing high objectives with his questioning practices. The technique yielded information from which group and individual interpretations could be made.

Congruence Between Unit Objectives and Unit Examination Questions-Macrocosmic View

Table 1 shows the cumulative cognitive indices for each student teacher's unit objectives and unit examination questions. These scores in themselves are revealing. As has been noted, because of the higher level being used as a reference point, all the scores fall somewhere from 0 to +1. To illustrate this concept

a continuum is shown with the two extreme points being 0 and +1. A 0 score on the continuum represents total emphasis on lower cognitive levels and a +1 score represents total emphasis on higher levels.



The location or point of a person's cumulative cognitive index on that scale reflects his individual style. The closer a cumulative cognitive index is to +1 then the closer that person has come to giving total emphasis to higher cognitive levels. It follows then that the closer a person's cognitive index is to 0 then the closer that person has come to giving total emphasis to lower cognitive levels.

TABLE I

UNIT PLANNING
CUMULATIVE COGNITIVE INDICES

Student Teachers	Unit Objectives	Unit Examination Questions	Difference Scores
A	+1.00	+.70	-.30
B	+1.00	+.26	-.74
C	+ .40	+.14	-.26
D	+ .56	0	-.56
E	+ .70	+.68	-.02
F	+ .88	+.75	-.13
G	+ .56	+.30	-.26
H	+ .70	+.70	0
I	+1.00	+.50	-.50
J	+ .74	+.57	-.17
K	0	+.70	+.70

This technique attempts to avoid making a value judgement about where a person's score should fall along the continuum. However, if a person knew the level at which he wanted to operate, then this technique could tell him if he was operating under those circumstances. For example, Student Teacher B designed unit objectives which totally reflected an emphasis on higher levels while higher level unit examination questions received only twenty-six percent of the emphasis. The difference could be very revealing to that individual depending on the direction of his ultimate goal.

Represented in the third column of Table 1 is the difference score between the cumulative cognitive index of each person's unit objectives and unit examination questions. This was obtained by subtracting the unit objective cumulative cognitive index from the unit evaluation cumulative cognitive index. This procedure was followed because of the assumption that the objectives are the standard or ideal which the questions ought to reflect.

The interpretations of the difference scores were based on two dimensions of congruency. One dimension was the quantity or magnitude of incongruency between the instructional objectives and questions. The other dimension was the directional degree or quality of the differences between the cognitive levels of the objectives and questions.

The magnitude of each person's incongruency is clearly shown by the absolute value of the difference scores as shown in Table 1. For example, Student Teacher K (+.70) was more incongruent in representing unit objectives through unit examination questions than Student Teacher A (-.30). In this case, the sign of the difference is not important. Instead, the crucial factor is the amount of difference from exact congruence or zero.

One can observe the direction of each person's incongruency by examining the direction difference scores in Table 1. A plus difference unit score indicates that the student teacher placed more emphasis on the higher cognitive level on unit examination questions than on unit objectives. A minus difference score indicates that the student teacher designed unit examination questions with less emphasis on the higher cognitive level than unit objectives. That is, the test was at a lower level than the level at which the objectives had been set. A zero difference score indicates that the student teacher tested at the same cognitive level as had been for the objectives.

As evidenced by the minus scores, there was a definite tendency for the student teachers to design tests with more emphasis on the lower cognitive level of their objectives. Nine student teachers out of eleven followed this pattern to varying

degrees. Note that three student teachers—A, B, and I—established objectives totally at a higher cognitive level, +1 cognitive index, but did not test consistently at that level. The largest discrepancy was with Student Teacher B who set all of his objectives at the higher cognitive level but who tested almost consistently—seventy-four percent—at the lower level. Student Teacher I was incongruent in the same direction but to a lesser degree. All of the objectives were at the higher level but only fifty percent of the emphasis on unit examination questions was at a high cognitive level.

The case of Student Teacher E is almost the opposite. Even though he has a negative difference score, his scores reflect almost total congruency. That is, he set seventy percent of his objectives at a high cognitive level and then designed sixty-eight percent of his test questions at a high cognitive level. Student Teachers F and J also had small difference scores indicating a small amount of incongruency.

Student Teacher K was incongruent in a unique way as compared to the other student teachers. Although he set his objectives with the emphasis totally on the lower level, seventy percent of his examination questions were at the higher level.

The scores of Student Teacher H reveal total congruency. He established objectives with the higher cognitive level receiving

seventy percent of the emphasis and designed test questions with the higher cognitive level also receiving seventy percent of the emphasis.

Table 2 provides the same information except that the results are shown for just the high school student teachers. Table 3 shows the cumulative cognitive index for the junior high student teachers. The means of the difference scores for the absolute values or magnitude and for the direction are also provided in Tables 2 and 3. As has been stated, the magnitude difference scores ignore the sign of the difference and reflect a quantification of the congruency dimension. Therefore, when determining the means for the magnitude of congruency only the absolute values were used in the computations. Consequently, when there are sign variations among the differences, the means for the direction differences, quality of incongruence, will differ from the magnitude of difference, quantity of incongruence. However, a word of explanation is in order before continuing with the discussion. The mean scores which are included in Tables 2 and 3 and on subsequent tables were computed for the eleven student teachers included in the study. Interpretation of mean scores for such a small number is difficult even though general trends can be noted. The primary justification for including mean scores in this interpretation was to illustrate how the technique can be applied for group interpretation.

TABLE II

HIGH SCHOOL STUDENT TEACHERS
UNIT PLANNING
CUMULATIVE COGNITIVE INDICES

Student Teachers	Unit Objectives	Unit Examination Questions	Difference Scores
A	+1.00	+.70	-.30
B	+1.00	+.26	-.74
C	+ .40	+.14	-.26
D	+ .56	0	-.56
E	+ .70	+.68	-.02
F	+ .88	+.75	-.13
I	+1.00	+.50	-.50

Mean of the Magnitude Difference Scores = .358

Mean of the Direction Difference Scores = -.358

TABLE III

JUNIOR HIGH STUDENT TEACHERS
UNIT PLANNING
CUMULATIVE COGNITIVE INDICES

Student Teachers	Unit Objectives	Unit Examination Questions	Difference Scores
D	+ .56	+ .30	- .26
H	+ .70	+ .70	0
J	+ .74	+ .57	- .17
K	0	+ .70	+ .70

Mean of the Magnitude Difference Scores = .28

Mean of the Direction Difference Scores = +.07

Note that there was more of a tendency for the high school student teachers to place emphasis on lower level as compared to higher level test questions than the junior high school student teachers. In fact, all of the high school student teachers tested at lower levels than the objectives indicated.

The largest difference was Student Teacher B who gave total emphasis to higher level objectives but only twenty-six percent of the examination questions had emphasis at the higher levels. The smallest difference was $-.02$ which means that there was only a two percent emphasis difference in the objectives and questions of Student Teacher E.

All of the direction difference scores are minus which indicates that the high school student teachers had a tendency to design examination questions with the emphasis or weight at a lower level than the level of their objectives. This is further amplified by the mean of the direction difference score which is $-.358$. Note that the magnitude difference score was also $.358$, since all differences were in the same direction, minus.

Overall, the junior high student teachers tended to be more congruent than the high school student teachers. While two of the junior high student teachers tested at lower levels than the levels of their objectives, the differences were not especially large at

-.26 and -.16. One junior high student teacher designed objectives and questions which were completely congruent with both being +.7. An unusual case is Student Teacher K who designed unit objectives with all the emphasis on lower levels. In contrast, seventy percent of the emphasis on unit examinations was on higher level questions. The magnitude difference scores for the junior high student teacher was .28 which can be interpreted that as a group they were incongruent to the extent that twenty-eight percent of their objectives did not match their questions in cognitive level and value.

The wide range of the difference scores limits their interpretation as illustrated by the mean. The direction difference score of +.07 indicates that as a group they were congruent, when in fact, three of them were incongruent and one, Student Teacher K, was especially incongruent.

The macrocosmic view, in summary, reveals some incongruency. This particular group of social studies student teachers seemed unable to design unit examination questions at the same cognitive level and with similar weighting as their unit objectives. Perhaps they were unable to design questions which were at high levels, or they were not aware of the desirability of achieving some degree of congruency between objectives and questions. What may be even more the case is that they did not give any consider-

ation to designing questions which were congruent with the objectives because there was no systematic method available for determining such information. Herein lies the value in the technique developed for this study. After giving careful thought to developing instructional objectives and evaluation methods, it is important to know if both are dealing with similar outcomes.

Congruence Between Daily Objectives and Key Questions -
Microcosmic View

Representing the microcosmic view, Table 4 shows the cumulative cognitive indices for each student teacher's daily objectives and key questions for that day's lesson. The third column is the difference score between the cumulative cognitive index of each person's daily objectives and the key questions.

Again in determining the cognitive indices for the objectives and questions, the higher level was used as the reference point so that there are no negative cognitive indices. A +1 cumulative cognitive index indicates total emphasis at higher levels while a 0 cognitive index indicates total emphasis on lower levels.

TABLE IV

DAILY PLANNING
CUMULATIVE COGNITIVE INDICES

Student Teachers	Daily Objectives	Key Questions	Difference Scores
A	+ .50	+ .70	+ .20
B	+ .60	+ .60	0
C	+ .20	+ .40	+ .20
D	0	+ .20	+ .20
E	+ .80	+ .90	+ .10
F	+1.00	+ .20	- .80
G	+ .90	+ .40	- .50
H	+1.00	+1.00	0
I	+1.00	+1.00	0
J	+ .80	+1.00	+ .20
K	+ .30	+ .90	+ .60

The same procedure was followed for determining the direction difference scores for the daily objectives and key questions as was used in the microcosmic view. A zero direction difference score indicates total congruency between the daily objectives and key questions. A plus direction score indicates more emphasis was placed on higher level key questions than higher level objectives. Conversely, a minus difference score reveals that more emphasis was placed on higher level objectives than higher level key questions.

There is a wide range of cumulative cognitive indices for the daily objectives. One student teacher put total emphasis on low level objectives while three placed total emphasis on higher level objectives. The remaining seven ranged from twenty percent to ninety percent emphasis on higher level objectives. The cumulative cognitive indices for the key questions also indicate a wide range from two at only twenty percent emphasis on high level questions to three with one hundred percent emphasis on high level questions.

As a group, the student teachers tended to be congruent when comparing daily objectives with key questions. Three of them were completely congruent with a zero difference score. Two of these had total emphasis on objectives and questions at higher levels.

Six student teachers planned key questions with more emphasis on higher level questions than on higher level objectives. This indicates that when they reached the point of designing questions for actual classroom use, they created questions which call for high level thinking on the part of the students. Also, the direction difference scores for those six student teachers do not indicate a consistently large discrepancy. For example, Student Teachers A, C, D, and J had only a $+.20$ direction difference score which indicates that they placed twenty percent more emphasis on higher level questions than on higher level objectives.

Two of the student teachers—Student Teacher F and Student Teacher G—had minus direction difference scores of $-.80$ and $-.50$ respectively. They designed objectives with either total or ninety percent emphasis on higher level objectives. While, comparatively their higher level questions received only twenty percent and forty percent emphasis.

Table 5 shows the cumulative cognitive indices for the daily objectives and key questions for the high school student teachers. Table 6 includes the same information for the junior high student teachers. Contrary to the findings in the unit planning of the high school student teachers, the differences in the findings from the daily plan do not reveal a consistent pattern. However, it does

TABLE V
HIGH SCHOOL STUDENT TEACHERS
DAILY PLANNING
CUMULATIVE COGNITIVE INDICES

Student Teachers	Daily Objectives	Key Questions	Difference Score
A	+ .50	+ .70	+ .20
B	+ .60	+ .60	0
C	+ .20	+ .40	+ .20
D	0	+ .20	+ .20
E	+ .80	+ .90	+ .10
F	+1.00	+ .20	- .80
I	+1.00	+1.00	0

Mean of the Magnitude Difference Score = .214

Mean of the Direction Difference Score = -.014

TABLE VI
JUNIOR HIGH STUDENT TEACHERS
DAILY PLANNING
CUMULATIVE COGNITIVE INDICES

Student Teachers	Daily Objectives	Key Questions	Difference Score
G	+.90	+.40	-.50
H	+1.00	+1.00	0
J	+.80	+1.00	+.20
K	+.30	+.90	+.60

Mean of the Magnitude Difference Score = .325

Mean of the Direction Difference Score =+.075

appear that the high school student teachers were more congruent than the junior high student teachers. Two of them were totally congruent, while three constructed key questions with twenty percent more emphasis on higher levels than the daily objectives. Student Teacher F, the only person who put only twenty percent emphasis on higher level objectives, offsets the effect of the four people who put more emphasis on higher level questions than on higher level objectives.

The mean of the direction difference score, $-.014$, is not a clear representation of the situation because of the presence of the one extreme case. Nor does the mean magnitude difference score of $.214$ provide a true picture of the differences. However, the tendency of the high school student teachers was to be congruent with a slight emphasis on higher objectives as compared to higher level questions.

The junior high student teacher closely paralleled the pattern they established for the unit plan. One student teacher was completely congruent with both daily objectives and key questions receiving total high level emphasis. Two others, Student Teachers J and K, planned key questions with more emphasis on the higher level than in the objectives. Student Teacher G designed key questions with less emphasis on the higher level than in the objectives.

The mean of the direction difference scores for the junior high student teachers is $+0.075$. This indicates a small difference, seven and one half percent, in the emphasis on higher level objectives as compared to higher level key questions, when, in fact, the range of the scores was from -0.50 to $+0.60$. The magnitude difference score, $.325$, is a better reflection of the incongruity between daily objectives and key questions.

The microcosmic view, in summary, does not reveal a pattern of either total congruency or total incongruency. In planning daily objectives and key questions, three people were totally congruent. Of the eight student teachers who were incongruent, five had scores which indicate a small degree of incongruency with difference scores of $+0.20$ or lower. The scores of the three others had degrees of incongruency at $+0.60$, -0.50 , and -0.80 . Although there is no distinct pattern in the scores, the daily objectives did tend to be more congruent with the key questions than the unit objective test items.

Congruence Between Macrocosmic View and Microcosmic View

A further analysis is made of the congruence between the macrocosmic and microcosmic view by comparing all the difference scores for the unit planning with all the difference scores for the daily planning. Table 7 provides this summary information.

TABLE VII

COMPARISON OF
MACROCOSMIC AND MICROCOSMIC
MEAN DIFFERENCE SCORES

	Macrocosmic (unit)	Microcosmic (daily)
Magnitude	Mean = .33	Mean = .254
Direction	Mean = .2027	Mean = .20

The difference scores show two very important concepts. First, the magnitude difference score indicates how much a group of questions deviated from a corresponding set of objectives. Second, and perhaps more important to the individual, the direction difference score indicates the direction of the deviation. In other words, it describes the degree of the emphasis on the high level cognitive functioning. If the thrust of the emphasis or weight was more on high level objectives than high level questions, then a minus direction difference score results. If the result is a plus direction difference score then high level questions were given more weight than the high level objectives.

Note that there is a noticeable amount of variation between the unit difference scores and the daily difference scores. There are two very obvious trends. The first is in the unit planning of the student teachers which tended to be incongruent. The student teachers designed test questions with the major emphasis on questions requiring low level cognitive functioning while their objectives had been set at higher levels.

The second trend is that the daily planning of the student teachers tended to be more congruent. Also, the direction of the incongruency which existed indicates that for daily planning the student teachers planned key questions with more emphasis on

higher cognitive functioning as compared to the emphasis on higher cognitive functioning in their daily objectives.

These trends are capsulized in the means of the unit planning and daily planning difference scores. The mean direction difference score of the unit planning is $-.2027$. Interpretation of this score is difficult since the student teachers were operating in very diverse situations with a variety of constraints with which to deal. However, one point does stand out as significant. Apparently, this group of student teachers made evaluation decisions about their students based on questions requiring a lower level of thinking than their objectives indicated.

The mean direction difference score for the daily planning is $+.02$. Two major observations can be made about this score. It is a smaller number than the mean unit direction difference score indicating less incongruence or more congruence. Also it is in a positive direction which means the key questions were planned with more emphasis on higher level thinking than the level called for in the daily objectives.

The means of the unit and daily magnitude difference scores, however, do not indicate as much of a discrepancy between the unit and daily planning as the direction difference scores. According to the mean magnitude difference score of $.33$, the unit planning tended

to be more incongruent than the daily planning with a mean magnitude difference score of .254.

The applicability of the difference scores—magnitude and direction—is apparent here. For example, while the mean magnitude difference score tells us that these student teachers were incongruent in both the daily and unit situations, it does not tell us how they are incongruent. The direction difference score provides that information with its indication of the focus of emphasis on higher cognitive levels.

Table 8 summarizes the results from one more perspective. It provides the means of the cumulative cognitive indices for objectives and questions from the daily and unit planning.

The mean cumulative cognitive index for the unit objectives was .66. The mean cumulative cognitive index for the daily objectives was very close to that with .65. In other words, this group of student teachers tended to set both unit and daily goals with approximately the same amount of emphasis at higher cognitive levels. However, the questions for unit and daily purposes which they designed did not have similar emphasis on higher cognitive levels. In fact, the unit examination questions had almost twenty percent less emphasis on higher cognitive levels than the daily key questions.

TABLE VIII

COMPARISON OF CUMULATIVE
COGNITIVE INDEX MEAN SCORES

	Objectives	Questions
Unit	Mean = .66	Mean = .48
Daily	Mean = .65	Mean = .66

Furthermore, the mean scores indicate that the student teachers were not only more congruent within their daily planning, but that the daily objectives and key questions were relatively congruent with the unit objectives. A probable explanation for this phenomenon is the possibility that the student teachers were able to conceive of the importance of relating a single day's activities to the overall goals of the unit. However, the student teachers were unable to maintain that congruent level of emphasis on higher levels when designing unit test questions.

Chapter V

SUMMARY AND DISCUSSION

This chapter presents a summary of the research design and findings. Conclusions are drawn from the results in relation to the research questions posed by the study. The ultimate value of any research in education depends on its relevance to current practices. In this chapter, the researcher explores possible implications for teacher education and classroom practices which the results of the study suggest. Some of the possibilities for future research are presented as suggestions for consideration.

SUMMARY

The purpose of the study was to develop and implement a technique which could be used to explore the congruency with respect to cognitive levels and value between the instructional objectives and questions planned by social studies student teachers.

Procedures

Eleven social studies student teachers trained at Virginia Polytechnic Institute and State University were used for the study.

One unit of instruction planned by each of these student teachers was chosen to be analyzed for the congruency between objectives and questions. The instructional objectives from a unit of study designed by each student teacher in the study were examined in relation to the value ascribed to each and to the cognitive level of each. To obtain both the macrocosmic and microcosmic view, the overall unit objectives and the objectives from a daily lesson plan in that same unit were examined.

The questions planned by the student teachers were also examined in relation to value ascribed and cognitive level within the macrocosmic and microcosmic framework. The questions on the unit examination were compared to the unit objectives. The planned oral key questions from a daily lesson plan were compared to the objectives for that day's lesson.

The objectives and questions were classified into two cognitive categories - higher and lower - by two raters to determine the cognitive level of each. A modified version of Bloom's categories was used as a guide in which Bloom's two lowest categories of knowledge and comprehension were considered equivalent to the lower cognitive level used in this study. The four remaining categories of Bloom's hierarchial system—appli-

cation, analysis, synthesis, and evaluation—were considered equivalent to the one category of higher cognitive level used in this study.

The measure of value or worth of objectives and questions is determined best by the teacher who created them rather than by external criteria. Therefore, the value assigned by each student teacher to his own objectives and questions was the measure of value used in this study. In the case of both the unit and daily objectives, the student teachers were asked to assign a weight to each depending on how important they perceived each to be to the students' total understanding of the unit. The measure of value used for the planned oral key questions was the weight assigned them by the student teacher with the criterion of how important each was to the students' understanding of the days' concept or content. The value of each unit examination question was determined by the credit each was worth when answered correctly.

Several analyses of congruency were possible using the measures of value and cognitive level of the objectives and questions. Specifically, the congruency between unit objectives and unit test questions was examined. Also, the congruency between daily objectives and daily oral key questions was examined. A comparison was also made of the total macrocosmic view with the total

microcosmic view.

Findings

The comparison of the cognitive indices revealed that the student teachers tended to be more congruent in their daily planning as compared to their unit planning. A comparison of the difference scores from the two groups of indices revealed more incongruency in the unit planning than in the daily planning.

Within the unit planning framework, the student teachers tended to design test questions at a lower cognitive level than the cognitive level of their unit objectives. The comparison of the cognitive indices in the daily planning revealed more congruency between objectives and questions than in the unit planning. However, there was less consistency from person to person in the daily planning so that a pattern was not apparent. The daily planning cognitive indices did reveal a tendency for the student teachers to plan oral key questions at a level equal to or higher than the daily objectives indicated.

Furthermore, the student teachers in junior high school tended to be more congruent than the student teachers in high school. The high school student teachers had a tendency to design both unit and daily objectives at higher levels than their test

questions and oral key questions. In contrast, the junior high school student teachers tended to design test and oral key questions at a higher level than their objectives.

An additional approach to the results reveals a key finding in the entire study. The average cognitive level of the unit objectives was very similar to the average cognitive level of the daily objectives; however, the average cognitive level of the unit test questions was lower than the average cognitive level of the daily oral key questions.

DISCUSSION

The findings as they relate to the research questions in the study are explicated in this section. The researcher has drawn certain conclusions based on the findings of this study as they relate to the literature on the role of objectives and questions in the teaching process. In addition, the implications for the use of the technique in teacher education and in the school setting have been explored. Some further developments of the technique for use in future research have been proposed.

Conclusions

The findings concerning each research question and the

conclusions drawn by the research follow:

1. What is the degree of congruence between the unit objectives student teachers develop to guide classroom instruction and the unit test questions designed to measure those objectives?

An analysis of the data using the technique developed by the researcher for this study revealed that the degree of congruence between unit objectives and unit examination questions could be determined. Individual scores or cognitive indices were available for comparison. One person's scores could be compared on both the unit and daily dimensions. In addition, the scores could be presented to provide a group picture.

The group of student teachers in this study as a whole tended to be incongruent in a negative direction on the macrocosmic dimension. That is, they designed test questions calling for low level cognitive behavior even though they espoused high level objectives.

The efforts at determining congruency in planning of student teachers have been meager and have determined the level of objectives by implication, that is, the level of the question implies the level of the objectives. Generally, however, the results of the study concur with other available findings (Tinsley, 1968; Pfeiffer and Davis, 1965). The student teachers found it difficult to design

test questions on the same level as the objectives created to guide the instruction.

There are some who say that using the performance of students on poorly designed test items leads to incorrect inferences (Baker, 1974). The results of this study dramatize this point only too well. Some very real implications are apparent for the participating student teachers. Each of these units, including objectives and tests from which the data were gathered, were actually taught in real classroom situations. In many cases, summative evaluation decisions were made about the students based on their performance on unit examinations. Apparently, it was not unusual for the students to be evaluated on questions calling for cognitive functions on a much lower level than the objectives which supposedly served the purpose of guiding the instruction. Student teachers need to be informed of the congruency, or lack of it, between their objectives and test questions. Whichever level of objectives considered desirable for particular instructional purposes should have questions which are equivalent in value and cognitive level.

What may even be more revealing is that each of these tests was "approved" by the student teacher's cooperating teacher in the school setting. Does this imply that the student teacher designs

objectives and tests similar to the cooperating teacher? If so, this technique could be just as useful and revealing for inservice teachers.

Evaluation is an inherent responsibility of the teacher. The nature of the teaching role in school places the function of evaluation primarily in the hands of the teachers. As Macdonald stated, teachers often fail to understand what is fundamental for evaluative judgement. Consequently an immoral type of evaluation often results.

Most teachers have objectives or goals that they say they seek to attain. These goals should be related to what is most important for students to learn about and learn how to do. Thus, moral evaluation is predicated upon the assumption that teachers understand the ideas with which they work, that they know what they are attempting to do, that they know when a pupil's performance demonstrates the success or failure of these objectives, and, further, that students clearly see this picture.

There is no real assurance, however, that this assumption is met in most teaching situations. Although most teachers have some idea of their goals, rarely can these goals be stated in lucid terms of what the teacher will look for in pupil behavior; and even less often are students apt to know what specific skills and abilities will be expected of them. (1975:19)

2. What is the degree of congruence between the objectives from a specific daily lesson plan student teachers develop and the key oral questions they compose to guide the discussion in that lesson plan?

The analysis of the data revealed that the degree of congruence between the objectives from a specific daily lesson plan and the key questions planned to guide discussion could be determined. Comparisons were made on an individual as well as on a group basis.

The group of student teachers in this study tended to be congruent in their daily planning. That is, the questions planned were similar in emphasis on higher levels as compared to emphasis on lower levels. Not only do the cognitive indices reflect congruency, they also tell the direction of the majority of the objectives and questions. More than half of the emphasis for both objectives and questions was at the higher level. Most of these student teachers planned key questions at an equal or higher level than objectives. These results are contrary to Tinsley's findings (1968) in which student teachers tended to design lower level questions for classroom use.

It was evidently an easier task for these student teachers to be congruent on a short term basis—daily plan—as compared to a long term or unit plan. They also seemed aware of the importance of the level of questions they asked. This is especially encouraging for Hunkins (1969) and Adams (1974) have demonstrated that the cognitive emphasis of questions can affect students' critical thinking.

In the methods course prior to student teaching, these student teachers received instruction and direction on the importance of the nature and sequence of oral questions in a classroom setting. Also they had participated in peer teaching situations in which they had an opportunity to practice these skills. The deliberate attention given to the question asking role of the teacher evidently made them much more aware of the importance of planning questions toward specific objectives.

3. What is the degree of congruence in the unit plan as compared to the degree of congruence in a daily lesson plan from that same unit?

A comparison between the congruence of the unit planning and the congruence in the daily planning could be made both on an individual and group basis. The student teachers in this study tended to be more congruent in their daily planning as compared to their unit planning.

Although the degree of congruency in the daily planning might be encouraging, it also points to a possible serious problem, not specifically examined in this study but potentially important. This group of student teachers not only designed daily questions which were congruent with their daily objectives but which were also of a higher cognitive level than the test questions on which the students'

grades were based.

If a teacher expects high level thinking from his students then he should provide abundant opportunities for practice. The evidence from the daily lesson plans indicates that these student teachers set objectives requiring high levels of thinking and did attempt to provide opportunities through the kinds of questions they asked. However, they then reverted to low level questions for the purpose of evaluation. The students' perception of this process was not investigated but is immensely important in understanding the dynamics of the teaching-learning process. A cynical, but perhaps honest question evolves from this situation. Why would a student exert himself to participate in a class discussion in which higher level thinking is required when he knows eventually he will be evaluated on his response to lower level questions?

One general interpretation emerges as a possible explanation for this situation. Apparently it is easier for student teachers to plan objectives and questions with more congruence on a short term basis than on a long term basis as in a unit plan. Perhaps it is an easier process when one is thinking of only one day and its consequences. So often, however, teachers use the unit examination as a summative form of evaluation. Decisions with far reaching consequences about students are often made on the basis of per-

formance on a unit test. The implications for the need for congruency between unit objectives and unit evaluation devices are obvious. Students should be evaluated in a manner consistent with the established instructional objectives.

Implications for Teacher Education and Inservice Teachers

Perhaps the true value of any technique which attempts to analyze some aspect of the teaching process rests in its utility to teachers. How can it help them improve their teaching?

The student teachers in this study may very well have been unaware of the extent to which they emphasized one cognitive level in their objectives while the other level was emphasized in their questions. Clegg provides two explanations for the predominance of low level thinking in classrooms. One reason could be the "lack of a comprehensive conceptual scheme for organizing and classifying questions from instructional planning". Another and, according to Clegg, more elusive reasons is the "lack of relatively simple techniques that a teacher can use to provide reliable and systematic feedback on the types of questions used and their effect upon students' learning." (1971:185) Pfeiffer and Davis (1965) called for processes which will make teachers more aware of their questioning practices through an analysis of their own examinations.

Teachers should take an analytical approach to their planning. Rogers stated that the teacher should analyze the type of thinking he "wishes to foster and the level . . . of the questions which are most suited to the particular learning situation." (1969:10) Just because it may be easier to design and use higher level questions for oral discussion than it is to design written test questions at the same level does not mean that incongruency should be accepted as inevitable.

As indicated by the results of this study, student teachers still need a specific understanding of the skills dealing with the purposes of preparing tests. This study suggested that these student teachers were not adequately prepared to plan a variety of test questions congruent with their objectives.

Even though these student teachers were congruent within their daily planning, other results suggest that they did not understand the functions of the daily lesson plan as a part of a whole—the unit plan. The incongruency between the unit planning and daily planning suggests that more attention should be given to how an individual lesson contributes to and is an inseparable part of a total unit plan.

Since inservice teachers may not necessarily be any more congruent than the student teachers in this study, the technique

is completely applicable to inservice teachers. In fact, the results from the use of this technique in actual school settings could provide some useful, albeit potentially explosive information.

For example, assume the technique was used at regular intervals over a specific period of time with the unit planning of all members of a department. If the results showed not only incongruency but the primary emphasis on lower order evaluation strategies, the real mission of that department is revealed regardless of what its stated philosophy might be.

A teacher interested in examining his own test practices could use this technique in a diagnostic manner. For example, if his scores revealed incongruency, he would have several options depending on his ultimate objectives. He might need to reconcile the weight of the test items by adding new items or deleting some. He may need to devise other methods besides test items on which to evaluate students. Another option is that more items may need to be added to the pool at either higher or lower levels to bring the questions in line with the objectives.

Implications for Further Research

A technique has been developed in this study which has the potential of being the first step in many analyses of teaching pro-

cedures. Including the value as well as the cognitive level of objectives and questions adds a dimension relatively unexplored in the research on questioning. The cognitive level of an objective is essentially meaningless until some measure of value or emphasis is ascribed to it.

The need for systematic attention to evaluation strategies suited to specific objectives has been called for by many (Billeh, 1974, Tinsley, 1971, Macdonald, 1975, Godbold, 1970). The congruency between objectives and questions is an inseparable part of that kind of research. Specific recommendations for further development of the research follow:

- 1) The technique needs to be expanded to allow for inclusion of all evaluation strategies used by the teacher. It is common practice for teachers to use activities such as group work, written research reports, contracts, and classroom participation for measures of evaluation. They too have inherent value and cognitive levels which should be investigated.

- 1) The student teachers in this study were not given any feedback on the congruence found in their daily and unit planning. The study could be expanded to include measuring the congruency, providing feedback to the teacher involved, and then measuring congruency again to determine the effect of feedback on their

performance.

3) The basic philosophical orientation of these student teachers was not determined. An examination of the relationship between the philosophy and congruency would be in order. For example, the evaluation strategies for inquiry oriented classes would likely be different from the evaluation strategies in a traditional classroom. Would the different strategies employed have an effect on the congruency between objectives and evaluation strategies?

4) This study explored only the planning procedures of the student teachers. The key questions they planned may not have been representative at all of the actual questions they used to lead the class discussion. A study which examines the relationship of daily objectives to the actual classroom questions used would be an even better measure of congruency.

5) The influence of text and supplementary materials on the planning and teaching style of the student teacher was not examined. An investigation into the effect of the organizational format and philosophical orientation of the textbooks used on the degree of congruency between objectives and questions could provide insight into the dynamics of teaching.

6) Would the results of this study be similar if the student

teachers had been in another field of study other than social studies. A replication of this study with other content areas, i. e., mathematics, science, English, could provide a basis on which to compare the congruency of student teachers in various fields.

7) This study was conducted with student teachers only. An exploration of the congruency of objectives and questions of inservice teachers is also in order. Would the established patterns and habits of inservice teachers cause different results?

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APPENDICES

APPENDIX A

PLANNING GUIDELINES FOR STUDENT TEACHERS

OUTLINE FOR UNIT PLANNING

- I. BASIC INFORMATION ABOUT CLASS
- II. OBJECTIVES
 - A. Unit Objectives derived from the following guidelines: directing learning toward the abilities of
 1. thinking competencies
 2. information processing skills
 3. social interaction and responsibilities
 - B. Specific Objectives from daily lesson plans
- III. PROCEDURES
 - A. Introductory Activities
 - B. Developmental Activities
 - C. Concluding Activities
 - D. Daily Lesson Plans which incorporate the above
- IV. MATERIALS AND RESOURCES
 - A. Teaching Aids to be used
 - B. Methods and Techniques to be used in teaching
 - C. Resources, Materials, Books, etc.
- V. EVALUATION
 - A. Unit Test or Examination to be used
 1. should count at least 50% of the unit grade
 2. indicate credit allowed for each question
 3. use cross-reference system to show which unit objective you are measuring

B. All Evaluative Techniques to be used

CRITERIA FOR DAILY LESSON PLANS

1. Does the daily lesson plan reflect one or more of the unit objectives?
2. Does the daily lesson plan identify specific objectives for that day?
3. Does the lesson plan identify how the lesson is to be taught? (Procedures to be used for teaching aims and objectives.)
 - A. Does the plan identify teacher activities to be performed?
 - B. Does the plan identify student activities to be performed?
 - C. Activities by others?
4. Does the plan include structuring comments and key questions for you to use as you develop the lesson?
5. Does the plan identify and/or include the materials and resources to be used for teaching the lesson?
6. Does the lesson allow for an appropriate amount of time for the learning activities? (Estimate the time for the various phases of the lesson.)
7. Does the lesson plan encompass clear, definite assignments which are related to the central aims and objectives? (In-class and homework assignments.)
8. Does the lesson plan include your evaluation of the day's accomplishments?

APPENDIX B

COGNITIVE LEVELS BASED ON BLOOM'S TAXONOMY

I. LOWER LEVEL

A. Knowledge Level:

1. General Statement -

- this level is the recall of specific facts and universal principles, the recall of methods and processes, or the recall of a pattern, structures, or setting
- this is the memory level
- this is the lowest level but not necessarily the easiest to answer

2. Terms to use in the statement of the objective -

- | | | | |
|-------------|---------|------------|---------|
| - define | - label | - recall | - state |
| - describe | - list | - recite | |
| - enumerate | - match | - repeat | |
| - identify | - name | - remember | |

3. Example of an objective -

- without references, the student will list the steps of the historical mode of inquiry in order

4. Example of a question -

- what steps do historians follow in conducting historical research?

B. Comprehensive Level:

1. General Statement

- this level consists of three operations:
 1. translation - the student changes information into different symbolic form of language
 2. interpretation - the student discovers relationships among facts, generalizations, and skills; then relates the inferences of his comparisons

3. extrapolation - the student estimates or predicts future or past consequences implied by the data, extends the data
 - this level offers the most questioning opportunities
 - it has been called the "bread and butter" of social studies
2. Terms to use in the statement of the objective - translation
 - change
 - convert
 - paraphrase
 - rephrase
 - rewrite
 - summarize

interpretation

 - compare
 - contrast
 - give examples
 - generalize
 - draw conclusions
 - explain
 - differentiate

extrapolation

 - infer
 - predict
 - extend
 - estimate
3. Example of an objective
 - given a textbook definition of revolution, the student will verbally convert the idea of a revolution into his own words.
4. Example of a question -
 - what is meant by the word revolution?

II. HIGHER LEVEL

A. Application Level:

1. General Statement -
 - this level uses abstractions in particular and concrete situations such as ideas, procedures, principles, methods, or theories
 - this level is usually used at the end of the unit or year

2. Terms to use in the statement of the objective -

- computes
- demonstrates
- discovers
- manipulates
- operates
- prepares
- produces
- shows
- solves
- transfers
- uses

3. Example of an objective -

- using any necessary references, the student will demonstrate knowledge of the historical research method by writing a term paper on an historical problem

4. Example of a question -

- choose one of the most pressing social problems facing our nation today. Write a term paper on the problem.

B. Analysis Level:

1. General Statement -

- this level breaks down a communication into its constituent parts
- this level consists of the critical thinking process

2. Terms to use in the statement of objective -

- breaks down
- diagram
- differentiate
- discriminate
- distinguish
- identify
- illustrate
- infer
- outline
- point out
- relate
- select
- separate
- subdivide

3. Example of an objective -

- given an historical account, the student will identify bias of the writer

4. Example of a question -

- what evidence of bias is there in Bancroft's interpretation of the American Revolution?

C. Synthesis Level:

1. General Statement -

- this level puts together elements and parts to form a whole
- this level represents a sort of self-expression
- the performer must create something
- this level is very similar to comprehension but synthesis must be original and unique to the performer, while comprehension requires only a restatement in a different way

2. Terms to use in the statement of the objective -

- | | |
|---------------|----------------|
| - categorizes | - plans |
| - combines | - rearranges |
| - compiles | - reconstructs |
| - composes | - relates |
| - creates | - reorganizes |
| - devises | - revises |
| - designs | - rewrites |
| - generates | - tells |
| - modifies | - writes |
| - organizes | |

3. Example of an objective -

- given all resources available, the student will create a schematic model depicting the relationship between history and the social sciences

4. Example of a question

- draw a picture which illustrates the relationship between history and the other social sciences

D. Evaluation Level:

1. General Statement -

- this level judges a product, communication, event or situation. One judges something as right or wrong, moral or immoral, good or bad, etc.
- this level should be made with criteria in mind
- this level is not the expressions of whim such as: "I like this."
- this level is the highest and most complex of cognitive behaviors

2. Terms to use in the statement of the objective -
 - appraise
 - assess
 - criticize
 - justify
 - support
 - judge
 - rank
 - rate
 - discriminate
 - evaluate
 - decide

3. Example of an objective -
 - given several sources of the information, the student will rate sources of information based on accuracy, completeness and relevance of data

4. Example of a question -
 - which of the following is the best source of information on the life of Abraham Lincoln? Why?

Adapted from "A Self-Instructional Module #1: Formulating Questions to Achieve Selected Cognitive Objectives: An Adaptation of Bloom's Taxonomy," by Merwin, William C. University of Georgia, 1972.

APPENDIX C

SUMMARY INFORMATION

OBJECTIVES AND QUESTIONS

UNIT OBJECTIVES

Please indicate your measure of the importance of each of the unit objectives to the student's total understanding of the unit by assigning a numerical weight to each objective

Unit Objectives

Importance

DAILY OBJECTIVES AND KEY QUESTIONS

You were asked to plan at least one day which was primarily devoted to the question/answer format. Using one of those day's lesson plan:

1. Plan at least five key questions to guide your discussion
2. In the spaces provided below list your objectives for that day
3. Please indicate your measure of the importance of each of the daily objectives to the student's understanding of the day's content by assigning a numerical weight to each objective
4. Similarly, indicate your measure of the importance of each of the key questions you have planned to the understanding of the content in that day's lesson. Assign a numerical weight to each question.

Daily Objective

Importance

Key Question

Importance

VITA

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Mary Ann Lewis

THE DEVELOPMENT OF A TECHNIQUE TO EXAMINE
THE CONGRUENCE BETWEEN INSTRUCTIONAL
OBJECTIVES AND QUESTIONS PLANNED BY
SOCIAL STUDIES STUDENT TEACHERS

by

Mary Ann Lewis

(ABSTRACT)

The purposes of the study were to develop and then implement a technique which examined the congruency in terms of cognitive level and importance or value between the objectives and questions planned by social studies student teachers. Specifically, a macrocosmic view of congruency as well as a microcosmic view of congruency was obtained by analyzing the objectives and questions from one unit of instruction planned by each of the eleven student teachers in the study. The macrocosmic view examined the congruency between the unit objectives and the examination questions which were designed to measure attainment of those objectives. For a microcosmic view, objectives from a daily lesson plan from the same unit were examined and compared for congruency with the key questions planned to guide discussion for that daily lesson plan. A comparison of the macrocosmic view and microcosmic view was included.

The measure used in this study, the Cognitive Index, was specifically designed to reflect the cognitive level and the value of an objective or question. The objectives and questions were classified into two cognitive categories—higher and lower—based on a modified version of Bloom's (1956) classification scheme of educational objectives. The weight or value of the objectives and questions was determined by the student teacher who created them.

The comparison of the cognitive indices revealed that the student teachers tended to be more congruent in their daily planning as compared to their unit planning. In addition, the student teachers tended to design unit test questions with more emphasis at a lower cognitive level than the cognitive level of their unit objectives. Although more congruency was revealed between daily objectives and daily key questions, the daily planning cognitive indices did reveal a tendency for the student teachers to plan oral key questions at a level equal to or higher than the daily objectives indicated.

Furthermore, the student teachers in junior high schools tended to be more congruent than the student teachers in high school. The high school student teachers had a tendency to design both unit and daily objectives at higher levels than their test questions and oral key questions. In contrast, the junior high

school student teachers tended to design test and oral key questions at a higher level than their objectives.

The results of the study indicated several implications for teacher education and inservice teachers. In addition, suggestions for further research are presented.