THE DEVELOPMENT OF A REFLECTIVE TEACHING

OBSERVATION INSTRUMENT

DISSERTATION

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* * * * *

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To my Mother, Father, and Brothers
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CHAPTER I

INTRODUCTION

Statement of the Problem

Reflective teaching is an instructional method based upon processes and operations of reflective thinking. In reflective teaching the teacher creates and directs learning experiences that enable students to develop and practice thinking skills while learning subject matter. The major goal of reflectively based instruction is to facilitate student centered thinking and learning, as opposed to teacher dominated instruction in which the students are told what they are supposed to think or learn.

A basic strategy for reflective teaching involves students in the following activities:

1. Identifying a problem or question.
2. Developing hypotheses that might serve to resolve the problem or answer the question.
3. Testing the hypotheses against available evidence.
4. Developing conclusions based upon the evidence which supports or refutes the hypotheses.
5. Applying the conclusions to new data.

The purpose of this study is to review the concept of reflective teaching, as defined by social studies educators, and to develop an
observation instrument that can be used to judge whether a teacher is implementing reflective teaching behaviors. The major questions to be investigated are:

(a) What low-inference teaching behaviors are deemed important characteristics of reflective teaching?

(b) Can a valid observation instrument be developed with which observers can identify low-inference reflective teaching behaviors reliably in videotaped teaching episodes?

**Significance of the Study**

Since 1909, when John Dewey discussed reflective teaching in his book *How We Think*, numerous social studies educators have continued to develop and clarify Dewey's notion of thinking and the applicability of that notion for social studies teaching (Griffin, 1942; Hunt and Metcalf, 1955; Massialas and Cox, 1966; Beyer, 1979). Today reflective teaching is still widely advocated as a preferred method of instruction in the social studies. However, many pre-service and in-service teachers have difficulty interpreting and translating the theory of reflection into specific teaching practices (Hunt and Metcalf, 1968; Beyer, 1979). One reason for this difficulty may be attributed to the high-inference terminology commonly used to describe reflective teaching. The overwhelming majority of the theoretical works on reflective theory incorporate high-inference terminology when
reflective teaching is at issue. For example, Hunt and Metcalf (1968) use the terms "felt problem," "democratic classroom," and "warmly permissive emotional climate" to describe some of the important characteristics of reflective teaching. Massialas and Cox (1966) use the terms "psychologically open and permissive" when describing classroom climate. Griffin (1942) emphasizes "previous learnings and mediating experiences as subject matter for the reflective process." Bode (1940) defines the act of thought as the "finding and testing of meaning." Dewey (1933) refers to the "continuity and reconstruction of experience" as an important element to the teaching-learning process. More elaborate examples of the use of high-inference terminology in the description of reflective teaching are found in the following passages:

To feel a problem is to be aroused psychologically to the point where one wants to learn enough about it to do something about it. This feeling has two components, doubt and concern. These components are both intellectual and emotional in their content. Any attempt to create a problem without arousing students emotionally can only result in a pseudo problem. When students are disturbed, upset, and perhaps even angry, they are closer to having a problem than will ever be the case in classes that are free from the clash of ideas (Hunt and Metcalf, 1968).

The climate of the reflective classroom is psychologically open and permissive. All points of view and statements are solicited and accepted as propositions which merit examination. Since the discussions in this view of the classroom are centered on problems and since problems themselves are largely indeterminate, this open pursuit of satisfactory conclusions is categorically implied.
The statements of students and teacher alike are judged by their relevance to the problem in question and other pertinent criteria. All who engage in critical inquiry are given the opportunity to affect its outcome in the open classroom. Only when this opportunity is a real one and is reinforced by the attitude and response of all is the individual free to make a contribution to the conclusion sought. It is not simply that each is permitted to say what he likes—though this may be the case, subject to the judgments of relevance and propriety—but that the substance of his statements will be taken into account and given its proper measure of influence in the conclusion decided upon. The discerning reader will have no difficulty in recognizing the above proposition as a corollary of the essential characteristic of a democracy—that all affected by a policy should have a voice in its determination. (Massialas and Cox, 1966)

In terms of pragmatic theory, this thinking must relate itself at all times to the reconstruction of experience; the problems dealt with must be "real" problems in the sense that they present difficulties in the experience of the pupil which are of concern to him in the interests of better adaptation. The sole direct path to enduring improvement in the methods of instruction and learning consists in centering upon the conditions which exact, promote, and test thinking. Thinking is the method of intelligent learning, of learning that employs and rewards mind. (Bode, 1940)

The above passages are examples of high-inference descriptions of concepts basic to the understanding of reflective teaching. The high-inference nature of this terminology may make it difficult for teachers to comprehend reflective teaching and to understand exactly how to implement reflective teaching in the classroom. As a result, teachers often tend to make subjective, diverse, and imprecise interpretations of what actually constitutes reflective teaching.
Such shortcomings not only make it difficult for teachers to practice reflective teaching but also make it difficult for researchers to obtain valid and reliable measures of reflective teaching in the classroom.

Research on reflective teaching has provided little evidence to support the contention that the reflective teaching method is more effective than a didactic method in effecting student achievement. The validity and reliability of the research has been questioned due to several weaknesses in the research design of the studies (Bayles, 1956; Quillen and Hanna, 1948; and Kight and Mickelson, 1949.). Metcalf (1963) identifies these weaknesses:

The studies by Bayles, Quillen and Hanna, and Kight and Mickelson fell short of testing the main propositions in Griffin's theory. Bayles relied too much upon standardized tests, but in doing so he proved that reflective method does not hurt a student's achievement of knowledge of facts. Quillen and Hanna defined a problem differently than did Griffin, to the degree that the latter's theory could not have been applied in their study except by accident. Quillen and Hanna, in their definition of a problem, emphasized that problems should deal with questions that have not yet been solved and should have an orientation to the future and to values; they placed much emphasis upon action rather than grounded belief as an outcome of reflection. Kight and Mickelson are theoretically quite close to Griffin in their conception of what outcomes to expect from reflection—the learning of rules of action together with the data that support these rules. They reveal a theoretical weakness, however, in their view of action as a necessary method by which to acquire knowledge.
The ambiguous and contradictory research findings on reflective teaching grow out of the failure of theorists and researchers to define reflective teaching carefully and to develop valid and reliable measures for determining the amount and quality of reflective teaching taking place in classrooms (Metcalf, 1963). Feely (1972) maintains that problems in conducting research on reflective teaching are directly associated with the conceptual confusion over the term itself, i.e., "reflective teaching." Based on the above assumptions, a prerequisite to all research studies dealing with reflective teaching would be to determine if the teachers are actually behaving in accordance with a clear and consistent operational definition of reflective teaching. The development of an operational definition of reflective teaching based on low-inference or observable teacher behaviors may resolve this problem.

One purpose of this study is to develop a valid and reliable observation instrument based on low-inference reflective teaching behaviors. Such an instrument will aid researchers in establishing criteria and standards by which to measure the occurrence of reflective teaching in the classroom. This should increase the confidence researchers place in the validity of research findings and also make it possible to seek consistent relationships when making comparisons across studies.

The low-inference reflective teaching behaviors contained in the instrument should also provide the basis for developing a clear set
of instructional objectives that can be used by teacher educators to train teachers in using the reflective method. For example, the reflectively oriented teacher needs to develop specific skills in the areas of questioning and leading discussions. The observation instrument will provide teacher educators with a tool with which to assess and evaluate a teacher’s ability to implement these skills. Information gained from an analysis of a teacher’s behavior should help teacher educators to identify specific reflective teaching behaviors that pre-service and in-service teachers need to acquire.

Based upon this information, teacher educators should be able to develop a more systematic training program for the development of reflective teaching behaviors in pre-service and in-service teachers. Using the observation instrument to measure a teacher’s achievement in applying the reflective teaching behaviors will also allow for a more accurate measure of the effectiveness of the training program.

Considering the emphasis social studies educators place on reflective teaching as a method of instruction, it is important that valid and reliable research be conducted to determine its relationship to student achievement. It is equally important that teacher training programs be evaluated for their effectiveness in helping teachers to acquire reflective teaching behaviors.

**Context of the Present Study**

Many observational systems have been developed which focus on classroom interaction. Zevin (1969) classifies these systems into
three major types: (1) cognitive interaction, (2) affective behavior patterns, and (3) multidimensional systems. He cites the systems developed by Smith (1962) and Bellack (1966) as examples of systems designed to measure cognitive interactions. These observation systems identify the ideas, reasoning skills, concepts, and data being explained or discussed in the classroom, but tend to overlook or obscure expressions of feeling, emotion, acceptance and rejection. Flanders (1966) and Withall (1949) developed systems that do concentrate on affective teacher behaviors such as expressions of feeling, rewarding, and encouraging participation. The third area of observational systems is referred to as a multidimensional system. This system is used to identify both affective and cognitive teacher behaviors. Examples include the OsCar technique developed by Medley and Mitzel (1955) and Ryan's (1960) Classroom Observation Record.

The central concern of this study is the development of an observation instrument designed to identify whether or not a teacher exhibits low-inference reflective teaching behaviors in a classroom situation and the frequency with which these behaviors occur. Cognitive and affective teaching behaviors are emphasized throughout the literature on reflective teaching as being important for effective reflective teaching (see Griffin, 1942, Hunt and Metcalf, 1955, Massialas and Cox, 1966). An observation system that identifies only cognitive interactions or affective behavior patterns would not give an accurate description of reflective teaching. Therefore, a
multidimensional observation instrument that identifies both affective and cognitive low-inference teaching behaviors has been developed.


Of the many observation instruments identified, only two were found that specifically related to reflective teaching—Lambert's (1976) *Observation Instrument For Reflective Teaching* and Zevin's (1969) *Categories For The Analysis of Teacher Behavior In An Inquiry Situation*. Although both of these instruments establish a good beginning for research, they are limited in their ability to judge reliably whether a teacher is exhibiting reflective teaching behaviors. The length of the instruments, for example, makes it
extremely difficult to use them accurately in classroom situations. The majority of the items used in the instruments to describe reflective teaching are of a high-inference nature, resulting in very subjective interpretations. Also the reliability of the instruments was tested by no more than three observers who were not specifically trained to use the instruments. Rather, the observers were selected simply on the basis of their familiarity with the reflective teaching process. When designing observation instruments of this type, measures of reliability should be calculated to determine if any trained observer can use the instrument reliably. Coefficients of reliability for observers should be calculated as a test of agreement on the behaviors being viewed. High reliabilities usually indicate that the system is clear and precise since most of the observers consistently call a behavior by the same name or code during observation.

This study seeks to improve upon the existing reflective teaching observation instruments by correcting the previously mentioned limitations and by developing a valid and reliable observation instrument. The observation instrument is designed to operationalize the process of reflective teaching into identifiable and observable teaching behaviors.
Definition of Terms

Reflective Thinking: "Active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends" (Dewey, 1933). Reflective thinking involves five steps between the pre-reflective stage, during which a problem is identified, and the post-reflective stage, following the resolution of the problem. However, it is important to note that Dewey, himself, states that the steps do not necessarily "follow one another in a set order" (Dewey, 1933). The five steps include:

1. suggestions, in which the mind leaps forward to a possible solution; (2) an intellectualization of the difficulty or perplexity that has been felt (directly experienced) into a problem to be solved, a question for which an answer must be sought; (3) the use of one suggestion after another as a leading idea or hypothesis, to initiate and guide observation and other operations in collection of factual material; (4) the mental elaboration of the idea or supposition as an idea or supposition (reasoning, in the sense in which reasoning is a part, not the whole, of inference); and (5) testing the hypothesis by overt or imaginative action Dewey (1933).
Reflective Teaching: The teacher structures a learning environment which encourages students to generate and test their own ideas. It is a process whereby learners develop meaning for themselves as opposed to being told what is right, true, or good (Griffin, 1942). The teacher nurtures reflective thinking among his students by involving them in learning situations designed to initiate the five steps of the reflective process. The teacher creates learning situations that involve students in the pre-reflective stage of a problematic situation and a post-reflective stage of a resolved situation. It is important to note that the process of reflective teaching parallels the five reflective thinking steps described by Dewey. As in reflective thinking, the five steps in the reflective teaching process do not necessarily follow one another in a set order. Rather, there may be many instances of overlap and concurrency. Therefore, a teacher who implements reflective teaching creates learning situations that allow students to:

1. Identify and define problem or question.
2. Develop hypotheses that might resolve the problem or answer the question.
3. Gather evidence that will verify or refute the hypotheses.
4. Develop conclusions based upon the validity or invalidity of the hypotheses under study.
5. Apply conclusions to new data not yet used to determine if other sources concur with their findings.
Throughout the reflective teaching process the teacher seeks to create a classroom climate conducive to a free and open exchange of ideas. The teacher accomplishes this by establishing and maintaining a positive rapport with students by being empathetic and accepting the students' ideas, opinions, and beliefs, and by posing questions that will facilitate open discussion.

The process of reflective teaching is inextricably intertwined with the subject matter being studied. This is consistent with Dewey's conception of teaching and learning which combines content and process into one method of instruction. Subject matter, in this sense, includes "any belief or purported knowledge which enters into the process of reflective thinking" (Griffin, 1942). Thus, subject matter may include the beliefs, attitudes, and opinions of students as well as data to be used as evidential material. Subject matter, then, is viewed primarily as a means for promoting reflective thinking rather than as an end in itself.

**High-Inference Behaviors:** These are teacher behaviors whose occurrence in the classroom situation can only be subjectively perceived.

**Low-Inference Behaviors:** These are teacher behaviors whose occurrence in the classroom situation can be objectively observed, identified, and counted (Hines, 1981).

**Limitations of the Study**

Theoretical works on reflective teaching have been reviewed in an attempt to identify concepts and behavioral statements that
are consistently used to describe reflective teaching. These concepts and behavioral statements have been translated into a set of observable low-inference teaching behaviors. A major limitation of such an approach is that each author describes reflective teaching according to his own conceptual orientation. Since the focus of the study is primarily on reflective teaching behaviors described by theorists in social studies education, it must be conceded that theorists in other fields may identify additional teaching behaviors that are also considered important for reflective teaching.

The study does not attempt to field test the instrument in live classroom situations. Rather, the observation instrument has been used by observers to rate videotaped teaching episodes. The observers were allowed to play back and review the tape several times. In live classroom situations these procedures would not be possible. Therefore, the results of this study might not be generalizable to include live classroom situations.

There are also limitations associated with the questionnaire survey technique used to validate the observation instrument. It was very important that each evaluator be knowledgeable about the theory and practice of reflective teaching. Only then would they be able to make informed judgments and comments about the items on the questionnaire. Hence, the number of respondents to the questionnaire was limited due to the specific nature of its content.

Another limitation concerns the method used to determine the reliability of the instrument. Criterion-related agreement scores
were computed using Scott's coefficient. Although these scores indicated high reliability, they only measured degrees of agreement between the criterion and the observers. Observer agreement only indicates that a consensus was reached regarding the teaching behaviors that were thought to have occurred during each teaching episode. It is possible that intense observer training could influence the observers to make similar errors of judgment. In other words, the reliability of the instrument is directly dependent upon the objectivity and skill of the observers who are using the instrument.

Another limitation concerns the nature of the subject matter presented in each videotaped teaching episode. It is possible that the observers' interest or lack of interest in the subject matter influenced their attention while viewing the tapes and thus affected their ratings.

A final limitation concerns the use of the terms operational definition and low-inference teaching behaviors. Both of these terms have been defined in a context which provides meaning for this particular study. It is acknowledged that the definitions of these terms as used in this study are not standard definitions that might be commonly used in research in this field.

The teacher behaviors identified and their relationship to reflective teaching have been dealt with in the context of social studies education instruction. Generalization of the findings of this study to other disciplines may be in error.
CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

The purpose of this chapter is to describe and evaluate the significant literature and studies that deal with the theory of reflective thought and the theory and practice of reflective teaching. The first section describes the meaning of reflective thought as defined by theorists in social studies education. Important concepts and ideas embedded in reflective theory are described and reviewed. The second section reviews empirical studies in which reflective thinking in classroom situations has been tested. In the third section the focus narrows to a review of the nature of reflective teaching. Three major areas are reviewed in this section. They are (1) reflective teaching and classroom climate, (2) reflective teaching and subject matter, and (3) the reflective teaching process. These three areas are consistently identified in the literature as important components of reflective teaching. Each area is examined through the writings of significant theorists in the field.

The Meaning of Reflective Thought

The theory of reflective thought developed from ideas and beliefs inherent in the philosophical, psychological and educational principles expressed in the writings of John Dewey. It was Dewey's conviction that the major goal of education is to develop and free
individual intelligence. To accomplish this goal it is necessary to create an educational environment in which experiences which require reflective thought are provided. According to Dewey, reflective thinking is "mind in use." It is the "active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends..." (Dewey, 1910).

The catalyst for reflective thought is a puzzling situation. This could be a personally felt problem, a confusing situation, or a conflict of ideas, beliefs, values. The cognitive dissonance caused by any of these situations creates a need for resolution. Until a resolution is achieved the individual remains in a state of confusion or doubt. It is the need to eliminate this confusion and doubt that motivates the reflective process. The process is described by Dewey as a complete act of thought, beginning with recognition of a puzzling situation and ending when doubt or confusion has been eradicated. Dewey identified five phases of reflective thinking. These five phases were presented in Chapter One, page 11.

Each phase involves an intellectual function deemed important when reflective thinking is used to resolve a problem. In the suggestion phase the tendency is to act upon the first ideas that come to mind. However, action should be delayed until the problem is clearly defined and the conditions and causes of the problem are analyzed. This analysis occurs during the second phase when intellectualization of the difficulty lessens the emotional reactions and provides a
clearer insight into the actual nature of the problem. In the third phase, hypotheses are formulated as tentative solutions to the problem. The hypotheses serve to guide the search for evidence which either supports or refutes each hypothesis. The fourth phase requires reasoning through the collected data for logical relationships and inferences. The product of this analysis is dependent upon the verified knowledge obtainable and is influenced by one's prior experience. The testing of the hypotheses occurs in the fifth phase when the theoretical ideas are transformed into action. The conclusions are verified only if supported by evidence and logically adduced. If verification is not feasible, alternative hypotheses are formulated and the process repeats itself.

It should be noted that in reflective thinking absolute verification of hypotheses is sometimes not possible to obtain. Conclusions formed reflect the accuracy and completeness of the evidence collected and are reevaluated upon the introduction of new evidence.

John Dewey's definition of reflective thinking is used by theorists in social studies education as a major referent for other inquiries into the process of thinking. Social studies education theorists who deal with reflective thought emphasize the value of reflective thinking and concur with the complete act of thought described by Dewey. The differences that exist among the various theories consist of variations in emphasis placed upon each step in the process. For example, whereas Bode (1927) emphasizes the testing aspects of the process, Kilpatrick (1925) emphasizes the origins of
problems. Aside from emphasis, however, the theories of the reflective method developed by social studies educators are consistent with Dewey's original definition.

Griffin (1942) interprets Dewey's definition of reflective thought as the following:

Reflection at its simplest level involves nothing more than the relationship of significance. That is to say, reflection implies that something is believed, or disbelieved. Not on its own direct account, but through something else which stands as witness, evidence, proof, voucher, warrant; that is as ground of belief. We say that one thing "means" the other. This "pointing" quality, this relationship between a fact which is known (i.e., believed on its own direct account at the level of recognition) and a further fact which is suggested by it and believed for that reason, characterizes all reflection, from single inference to the most elaborate scientific thinking. (Griffin, 1942)

Hence, Griffin sees reflection as a process by which meaning is created. The major components of the process involve a state of perplexity or doubt and a search for facts which will reduce doubt.

Griffin's description of the reflective method is consistent with Boyd H. Bode's definition of the nature of thinking. Bode (1940) defines the "act of thought" as the finding and testing of meanings. Like Dewey and Griffin, he places emphasis on the resolution of problems and verification of conclusions as an integral part of reflective thinking. His is a three step model beginning with the recognition of a problem, formulation of hypotheses (ideas, suggestion, meaning, hunch), and finally, the testing process which could take the form of discovery-and-explanation or prediction-and verification.
Bode recognizes the product of reflective thinking as learning, based upon understanding or grasping meaning. This idea is consistent with the pragmatic philosophy and field psychology that influenced Dewey's works. Learning is considered by Bode to be a process of continuous adjustment. The problems that evolve from this constant state of adaptation require resolution. Problems are solved by drawing on insights gained in previous learning situations and, by developing new insight grounded in evidence. Testing insights may lead to generalizations which can be used as data when confronting similar situations in the future.

The relationship of reflective thinking to learning is based on the ideas that past conceptual understandings can be used to further learning while resolving problems. Learning grows out of an application of lessons learned in one's past experiences and their application to current problems. These learning experiences provide a frame of reference for resolving problems. Bode offers the following example to illustrate how learning coincides with reflective thinking during a problem solving situation:

A pedestrian making his way along a difficult path. He picks and chooses as we say; which means that a whole field, consisting of environmental relationships and bodily reactions is in continuous reorganization. This process of reorganization is not, indeed, the same as learning, since no new elements may be involved. The case is different if our pedestrian discovers, as a result of his experience, that clay is slippery whereas sod or gravel affords a firm footing. He learns about clay, for example, provided that he notes the connection between the appearance of clay and what the clay does to him when he tries to walk.
on it. To note the connection is to learn something, and the learning takes the form of changing the experience. The clay now looks slippery; it has acquired meaning. Such change in an experience whereby it becomes more serviceable for the guidance of behavior is what is meant by learning. (Bode, 1940)

A common element can be noted between Bode's description of meaningful learning and Griffin's emphasis on previous learnings and mediating experiences as subject matter for the reflective process. Both Bode and Griffin find referent in Dewey's notion that learning is an outgrowth of a continuous reconstruction of experience. According to the principle of continuity, previous experiences are reconstructed so as to create new understandings through the process of reflection. According to Bode, learning occurs when reflective thinking produces meaningful insights that are useful to the learner when seeking further understandings or when resolving a problem.

Hunt and Metcalf (1955) further develop the theory of reflective thought by clarifying the role of "insight" in the thinking and learning processes. They explain that all insights are considered hypothetical until they pass the test of evidence. Once a hypothetical insight is proven valid it becomes a "true-insight." The valid insights must lead to the formulation of a logical generalization. The generalization serves as an organizer of the information that has been learned so that the insight can be drawn upon in future problem situations.

Hullfish and Smith (1961) identify sentiency, memory, and imagination as three interrelated components important for thinking.
The following example of a man watching a fire in a fireplace illustrates how sentiency, memory, and imagination work within the thinking process. The man has been asked what he is doing and his response was, "Nothing really, just thinking." Hullfish and Smith explain in the following passage what "just thinking" might mean:

His thoughts... might be localized almost within memory. If this is the case, we may properly call his thinking reminiscence... of the past. On the other hand, his "just thinking" may be of the "what might have been" variety. Here thought dances back and forth between memory and imagination as he engages in reverie or daydreaming... If his thoughts should surge forward in an even less restricted way, quite unrelated to the world that surrounds him and assails his senses, we would find him indulging in fantasy....

From time to time, however, the shifting lights and crackling sounds of the fireplace may barely stir him.... His mental activity will be little more than sentiency. We would not ordinarily use the expression "thinking" to describe such an interaction between an organism and its environment.... It is characteristic of such thought that while one aspect may be predominant at a given time, overtones of other aspects are normally present. (Hullfish and Smith, 1961)

Phillips (1974) insists that teachers who are attempting to improve their students' thinking skills must understand the interrelatedness of sentiency, memory, and imagination. He explains that past experiences are used to attribute meaning to everyday occurrences. In situations where past experiences prove inadequate for interpreting a situation, a need arises to stop and think. For example, if the man referred to above was unaware of the fire in the fireplace he would likely stop to think before he could recognize and give meaning
to the crackling sound. Uncertainty and doubt replace understanding and recognition. New meaning and knowledge is then sought in order to resolve the uncertainty and doubt. "The key to effective thinking... is the controlled use of sentiency, memory, and imagination in a balance that is appropriate to the particular purpose or problem at hand" (Hullfish and Smith, 1961).

Wellington and Wellington (1960) agree with the idea that sentiency, memory, and imagination are important for thinking. They explain that all these forms of thinking play a part in the higher-order cognitive function of problem solving. However, it is problem solving through the use of "reasoning" that is the most important form of thinking.

Hullfish and Smith (1961) and Hunt and Metcalf (1968) explain how the use of reasoning to resolve problems involves analytic, synthetic, and normative truth. Analytic truth refers to matters of definition where the meanings of words and understanding of concepts is in question. Synthetic truth refers to generalizations and relates to the question of empirical validity. Normative truth has to do with the choice of values and the making of value judgments.

As mentioned above, arriving at analytic, synthetic, and normative truths involves three kinds of thinking applicable to the reflective method. Massialas and Cox (1966) explain that the analytic, synthetic, and normative components of the reflective method are not clearly separated, although various models of reflective thought might emphasize one aspect over another.
Hunt and Metcalf, for example, emphasize analytic and normative types of thinking. They define values issues as problematic areas of our culture in which questions, controversies, and social conflicts cause argument and stress within a society. Their concern is for resolving both personal and social ethical conflicts as a means of cultivating mental health in individuals and of developing a citizenry competent to engage in decision making.

Oliver and Shaver develop a similar approach to the reflective method by stressing the normative aspects. They suggest that a "jurisprudential framework" be used to open negotiation of all positions referent to inquiry into social issues. The classroom is described as a forum in which: (1) positions or beliefs are exchanged, (2) values are clarified and defined, (3) final or ultimate ethical values are uncovered, and (4) a consensus is negotiated or a compromise is reached (Oliver and Shaver, 1966).

The analytic and synthetic aspects of reflective thinking are emphasized in models that usually require three basic steps: (1) forming hypotheses, (2) testing the hypotheses, and (3) drawing a conclusion. Beyer (1971) developed a model which expands on these three steps. His model does not necessarily operate in a straight line from problem to conclusion. Further, its operations occasionally double back on each other, occur simultaneously and sometimes are even left out altogether. Thus, Beyer's model is the most comprehensive model to be found in the literature. His description of the reflective method requires the use of analytical thinking,
intuitive thinking, inductive and deductive reasoning.

The analytic, synthetic and normative aspects of the reflective method are also brought together in the works of Massialas and Cox (1966) and Massialas and Zevin (1967). Both sets of authors combine reflective thinking, inductive thinking, problem solving, discovery, and normative judgment into a comprehensive description of the reflective method.

Summary

Section I has presented a review of literature dealing with the reflective method. A general overview of the reflective method theory as it evolved from its original conception by John Dewey has been developed and various interpretations and adaptations by scholars in the field of social studies education have been discussed. It is clear that all the models find referent in Dewey's problem-solving method of learning. All seem to concur, with only minor changes, on the five step reflective thinking process described in Dewey's How We Think.

The following section will present a review of empirical studies that were conducted on the use of reflective thinking in classroom teaching.

Studies on Reflective Teaching

The Bayles' Studies

At the University of Kansas in 1947 a group of masters students, under the supervision of Ernest Bayles, conducted experiments dealing with reflective teaching. The studies compared the achievement scores
of students taught by the reflective method with student achievement scores of students who had been taught by traditional methods, (i.e., expository/lecture method.). The results indicated that the students taught by reflective teaching methods scored higher on standardized tests than the national test scores of students who supposedly had been taught by traditional methods.

The validity of these results has been questioned due to several weaknesses in the research design. The teachers who were involved in the study were not experienced with the reflective teaching method. The amount and quality of reflective teaching taking place in their classrooms was not verified. No control groups were used and standardized tests were employed that tested factual recall and not the ability to think reflectively (Metcalf, 1963).

**The Stanford Social Education Study**

Quillen and Hanna conducted the Stanford Education Social Study of 1948. The study was designed to compare the topical, chronological, and problem solving approaches as a means of teaching American History reflectively. A distinguishing feature of this study was that the researchers had an entirely different conception of reflective thinking than that of most social studies educators.

One important difference is related to the meaning of what constitutes a problem in a reflectively oriented lesson. A "problem" for Quillen and Hanna had to be a question for which no one had an answer. They insisted that a problem solving experience had to be
followed by some form of social action:

Thus, all problems selected for study should lead to some form of action. When school and community problems are studied, the action may be overt and direct; but when the problem is a complex one of national or international scope, the action may take some other form. The drawing of a conclusion from a number of possible solutions plus the doing something about it after the solution is reached are features of the problems approach which distinguish it from both the topical and chronological approaches. (Quillen & Hanna, 1948)

This idea differs from Griffin's notion that the major objective of reflective teaching is better grounded belief. In Griffin's opinion, if a problem motivates students to listen or read, and this action helps students to ground their beliefs, then listening or reading are sufficient forms of action.

The concluding results of the Stanford study are described in the following passage:

The Stanford Study concluded that the problems approach, although not clearly superior to the chronological approach, was better than the topical approach in fostering such outcomes as critical thinking, good study habits, work skills, knowledge and understanding of the subject, knowledge of contemporary affairs, and consistency of attitudes. The significance of this difference is not clear since the difference between a topic and problem was never adequately developed. (Metcalf, 1963)

The Kight-Mickelson Study

Kight and Mickelson (1949) compared the effects of problem-centered instruction with subject-centered instruction on students'
acquisition of factual information. They also sought to compare the effects of problem-centered instruction with subject-centered instruction on the students' learning of rules of action together with the data that support these rules.

The study involved twenty-four teachers who taught problem-centered units and subject-centered units to 1,415 students in English composition, English literature, science and social studies classes. The problem and subject-centered units were taught in rotation in order to exclude variation in results due to teacher competence. Kight and Mickelson concluded that the students' acquisition of factual information was greater in the units taught through a problem-centered approach. The problem-centered units were also more significant in helping students learn rules of action in all four subjects.

Kight and Mickelson's conception of reflective thinking indicated that the learning of rules of action based on supporting evidence should be considered an acceptable outcome of reflection. This conception is consistent with Griffin's definition of action as an outcome of reflective thought. However, Kight and Mickelson viewed action as a means by which to acquire knowledge. They commented that classroom presentations should make "doing rather than knowing primary in presentation" (Kight and Mickelson, 1949). The notion that one simply learns by doing is a common misinterpretation of what Dewey meant by experience. Neither Dewey nor Griffin claimed that one learns by simply doing. This significant misinterpretation of the
reflective theory reduces the validity of the results in Knight and Mickelson's study.

**The Indiana Studies**

The "Indiana Studies" consisted of four doctoral dissertations conducted by Massialas, Cousins, Elsmere, and Cox between the years of 1960 and 1963. Each of these studies compared the students' acquisition of factual information in experimental classes taught by the reflective teaching method with the acquisition of factual information by students in a control group taught by didactic teaching methods. The students in the reflectively taught classes were found to have retained slightly more factual information than the students in the control groups. Again, the validity of results is open to question due to the types of evaluation instruments used by the researchers. Teacher-made tests, for example, were used as an evaluation instrument by two of the researchers. The tendency to teach toward the test may have confounded the results of the investigations.

**Summary**

Section II has presented a review of empirical studies that have investigated the effectiveness of the reflective teaching method. The lack of research in this area has been attributed to the confusion and ambiguity associated with the concept of reflective teaching (Metcalf, 1963, and Feely, 1972). The studies that were reviewed provided little evidence that reflective teaching was more effective than didactic teaching in promoting student achievement. The weaknesses in research design, which were identified in Chapter 1, indicate that a clear and
consistent operational definition of reflective teaching is needed in order to have valid and consistent research findings.

The next section will focus on the process of reflective teaching. This section will review the literature which translates the theoretical ideas into concrete teaching practices. Three components of reflective teaching will be discussed: classroom climate, subject matter, and teaching strategies.

Reflective Teaching

Classroom Climate

Charlotte Crabtree (1967) states that a theory of reflective thought involves much more than just the processes involved in rational problem solving. The logical operations of thinking are essential but are only part of the complete theory of reflective thinking. The affective and motivational states of the learner also play an important role in effective reflective thinking. Crabtree addresses the importance of the interrelated nature of cognitive and non-cognitive functions as they relate to reflective thinking:

In short, to conceive of thinking in terms of rational, ego-directed processes alone is to abstract a partial picture of what is a complex interplay of events. For analytic purposes it is well to separate these processes for study. To be unconscious of their interrelationships, however, is to be ill-equipped for conducting reflective thinking experiences within the school.

In part, the interrelationships considered here are interactions between the rational processes of
ego-directed, logical thought, and the preconscious processes by which intuitive, or creative, thinking is generated. Mediating both operations are important affective and motivational states of the learner which influence how he confronts experience, structures his belief and value systems, and responds to the discrepant evidence challenging the authority of beliefs he holds "true".

Theories which consider logical operations alone generally do not purport to explain these non-cognitive interactions influencing thinking. An adequate theory of instruction, therefore, cannot be derived from the logic of inquiry alone. It is in the logic of inquiry that the foundations of a reflective theory of teaching are to be found. But it is in developmental studies of children, in learning theory, and in psychoanalysis, that important insights have been derived concerning the origins, development, and noncognitive processes of thought. Multiple sources, therefore, must be taken into account. (Crabtree, 1967)

The implication of the above statement for reflective teaching is that teachers must develop more than just an understanding of the processes of reflective teaching if they are to stimulate reflective thinking among students. In addition, teachers must also understand how to create a proper classroom climate that is conducive to reflective thought.

Massialas and Cox (1966) explain that the implementation of reflective teaching behaviors requires a teacher who is empathetic and accepting of students' feelings and ideas. The reflective teacher attempts to clarify students' feelings and use their ideas in a positively reinforcing manner. All perspectives, even those contrary to the teacher's most cherished values, are accepted as worthy of examination.
Griffin offers a vivid illustration of this type of classroom climate which exemplifies reflective teaching:

...Whenever a child spontaneously offers as his own a statement in propositional form, the indispensable raw material for generating reflection has been provided... Any statement by any student which appears to represent a conviction or an idea held (however tentatively) by that student must be eagerly welcomed and taken seriously by the teacher. The "eager welcoming" of such a statement is not intended to cover such reactions as "Very good, Johnny--that's a fine contribution. Now who else has any ideas?" Rather it means the actual entertaining of the ideas suggested--the exploration on the spot of its implications, and possibly also of its grounds. When this public consideration of a particular statement seems likely to inhibit rather than to forward an ongoing discussion, the teacher may quite properly content himself with making a note, and promising to explore the idea with the student later; he may also, if he can, throw out a quick example which challenges without demolishing the belief in question and thus draws the student toward more adequate formulation and toward further grounding of his belief. The central point is that whenever a student expresses a judgment, a belief, a conviction, an idea, an opinion, a hypothesis, something further ought to happen to it. (Griffin, 1942)

Jewett (1971) further explains and emphasizes the importance of a proper classroom climate for the promotion of reflection:

An intellectually permissive atmosphere is essential for a worthwhile discussion and an important factor in gaining maximum student participation in the discussion. All that is meant by the term "intellectually permissive atmosphere" is a classroom environment in which students feel free to express their opinions, knowing that their opinions will be courteously,
fairly entertained, but rigorously analyzed. If an idea expressed by a student is met with sarcasm, that student and probably others will hesitate to participate in class in the future. If the teacher indulges in personal attacks rather than in an examination of the ideas presented by the students, he will dry up the flow of honest discussion. This does not imply that the teacher should praise or accept without critical examination an inane, thoughtless, irrelevant or inappropriate comment of a student. The purpose of establishing a permissive atmosphere is to promote a worthwhile discussion, not to stimulate participation for the sake of participation. The point is that the teacher should see to it that the ideas expressed by students in the course of a problem-solving discussion are energetically, carefully, but fairly examined. (Jewett, 1971)

To create "conditions which exact, promote, and test thinking," the teacher must apprehend the essential elements of the thinking process and create opportunities for students to experience situations which require reflective thought. The teacher's role is one of facilitator in creating the conditions that nurture thought. Massialas and Zevin believe that the ability of a teacher to stimulate and guide reflective thought requires "an attitude which encourages innovation and experimentation, which frees individual intelligence, which invites opinions, suggestions, and the exploration of alternatives" (Massialas and Zevin, 1967). Zevin translates this description of the reflective teacher into the following teacher's attitudes:

1. A belief in students' ability to think and reason in a logical manner, and to be inventive and imaginative.
2. A belief in the value of extensive classroom participation.

3. A belief in the free and open exchange of ideas.

4. A belief that students should be encouraged to make up their own minds about value commitments.

5. A belief that the teacher should excite and motivate students, to "make learning fun."

6. A belief that students should develop skills of analysis and criticism even if this means questioning authorities, including the teacher (Zevin, 1969)

These attitudes, according to Zevin, find expression the reflective teacher's behavior in the following manner:

1. Using, paraphrasing, and extending student ideas—use of ideas offered by the members of a class. [This type of recognition becomes a kind of reward system in place of simple praise or criticism of ideas.]

2. Asking broad analytical questions, i.e., those involving more than one acceptable response.

3. Asking broad normative questions involving judgments of right and wrong, good and evil standards of morality.

4. Directing classroom activities by suggesting as well as commanding.

5. Eliciting broad analytical responses.


7. Stimulating students to offer their own ideas and suggestions.

8. Stimulating students to present their own ideas about good and evil.
9. Encouraging students to discuss both analytical and normative ideas with one another.

10. Generally encouraging as much student exchange of ideas and opinions as possible (Zevin, 1969)

Phillips (1974) identified four areas that he deemed important for creating classroom conditions conducive to thinking. They include: (1) creating the condition of doubt, (2) creating a climate of controversy in the classroom, (3) fostering an open, permissive classroom atmosphere, and (4) creating the condition of intellectual rigor in the classroom.

The first area, creating the condition of doubt, is extremely important for initiating a desire among students to think through a problem and to achieve resolution. If students are unconcerned or indifferent about the topic being studied, there is little likelihood that serious thinking will result. Phillips offers the following strategies that may be used to "evoke puzzlement, doubt, and concern about a belief introduced for study":

1. The teacher can offer a problem to the class within the context of the content.

2. The teacher can encourage the class to discover a problem within the context of the content.

3. The teacher can transform the unexamined beliefs of students into problems.

4. The teacher can identify conflicts among students' belief patterns, thereby creating problems.

5. The teacher can identify conflicts within the course content, thereby creating problems. (Phillips, 1974)
The second area identified by Phillips deals with creating a climate of controversy in the classroom. This refers to the type of intellectual stimulation that causes perplexity, doubt, and indecision. According to Phillips, it is not enough simply to initiate the strategies mentioned above. Rather, the teacher must have a sound understanding of the types of doubts, concerns, and conflicts that will stimulate student interest. Only then can he select the content that will cause doubt among his students and be able to present it in a controversial context that will solicit differing opinions.

The third area, fostering an open, permissive classroom atmosphere, is one in which "students feel free to express their personal views, while fully realizing their views will be courteously and fairly received, though rigorously scrutinized" (Phillips, 1974). Phillips refers to three teacher qualities or attitudes that will help promote this type of intellectual climate:

1. The teacher must be a real person in his relationship with students. That is, he is one who can exhibit enthusiasm, boredom, anger, interest in students, sympathy, etc.

2. The teacher must "prize" the learner, prize his feelings, his opinions, his person. "Accept" the learner as an individual person, having worth in his own right. Have a "basic trust"--a belief that the learner is fundamentally trustworthy.

3. The teacher must exhibit empathetic understanding. That is, he has a sensitive awareness of the way the process of learning appears to the students.
The fourth area, creating a condition of intellectual rigor in the classroom, emphasizes the need to establish a climate in which students' beliefs can be rigorously tested and analyzed. This means that any hypothesis or tentative conclusion put forth by a student is not accepted as accurate until it has been grounded in evidence. Students need to be guided by the teacher in developing valid and reliable conclusions based upon deductive reasoning.

Wellington and Wellington (1960) state that an atmosphere of cooperation in the classroom is very important for promoting effective learning. This type of cooperative classroom climate is established through the democratic leadership provided by the teacher. The role of the teacher is described in the following passage:

Cooperation in the classroom entails insistence by the teacher upon learning subject matter, but at the same time recognition of student needs for which the subject matter offers help, and constant aiding of students in the process of problem solving and judgment. ... The democratic teacher uses and emphasizes the process of problem solving by allowing the student enough freedom not only to determine his problem but to formulate his own personal judgments. While the teacher obviously does direct, because he leads the student to do this very thing, he cooperates by helping him to do it. Because of the leadership inherent in the process, the judgments which are formed are made not in isolation..., but with help from the teacher, so that the student investigates thoroughly while considering the hypothetical character of his judgments. (Wellington and Wellington, 1960)

Summary

It is evident from the previous discussion that classroom climate is extremely important to the development of the reflective
method of education. Teaching strategies and the teacher's attitude should nurture an uninhibited discussion of beliefs, ideas, and opinions. The objective is to develop a classroom climate which is conducive to reflective thinking by being "problematic, open, non-threatening, intellectually permissive, socially sensitive, accepting of individuals and ideas, and intellectually rigorous" (Lambert, 1976).

Subject Matter

The process of reflective teaching described above is inextricably intertwined with the subject matter being studied. This is consistent with Dewey's conception of teaching and learning which combines content and process into one method of education. In accordance with this notion the reflectively oriented teacher selects and uses subject matter as a means for promoting reflective thinking. Subject matter, in this sense, performs a dual role which deals with the beliefs, attitudes and opinions of students and the data from a variety of sources that can be used as evidential material. Griffin (1942) clarifies how the reflective teacher should interpret the use of data or subject matter:

Shifting the emphasis in the teaching of high school history toward the use of historical materials in reflection requires a reorientation at several points. In the first place, we need to consider what the term "subject-matter" is going to mean within the new frame of reference.

It is clear enough that what used to be called "subject-matter", namely, the content of the textbook or course of study, has status within
the theory we are considering only to the extent that it actually enters into the reflective experience of students. We may reasonably anticipate that much of it will never get inside the process at all. Presumably we shall have to regard "subject-matter" in its familiar sense as "potential subject-matter" within the reflective process, which may or may not be learned, depending upon its coming to be seen as relevant...

We are therefore justified in giving the name "subject-matter" to any belief or purported knowledge which enters into the process of reflecting thinking. (Griffin, 1942)

One inference that can be taken from Griffin's description of the role of factual information in the reflective process is that the selection or use of content is dependent upon its relevancy to the problem being studied. In the reflectively oriented classroom, the rote memorization of facts, merely for the purpose of regurgitation, is seen as irrelevant to the learning process. Factual information (or subject matter) assumes meaning when it is used as evidence to support a conclusion, warrant a belief, or resolve a problem. Hunt and Metcalf support this notion:

There is only one role which facts can play in meaningful learning; to function as evidence. If they do not, they may perhaps be memorized and retained for a while, but their meaning and future usefulness will be slight. (Hunt and Metcalf, 1968)

The use of students' past experiences as subject matter is an important consideration for reflective teaching. In Dewey's words, "the principle of continuity of experience means that every experience both takes up something from those which have gone before and
modifies in some way the quality of those which come after" (Dewey, 1910). Therefore, the teacher must organize subject matter in an orderly but dynamic fashion. Experiences as subject matter are considered worthwhile when they promote self control, judgment, and ability to evaluate and use ideas, when it contributes to problem solving, and when they lead to further experience. In other words, a good experience is growth that brings further growth (Worton, 1969).

Griffin believed that the use of subject matter for the reflective experience is justified by the extent to which it actually stimulates reflective thinking. There are three types of subject matter that he cites as being relevant to the reflective process. The first is the "experienced object" for which a meaning is being sought. This would include whatever problem, conflict, or content that is identified for investigation as potential subject matter. The second type includes any previous learnings that students have acquired which gives new meaning to the object of study. Previous learning, along with any identified evidence which supports this learning is also considered to be subject matter. The third type of subject matter includes any other experiences that are needed to relate the new "object" of study to the previous learning. In other words, further experiences serve as "mediating experiences" between the object and previous learning.

According to this description, subject matter in the reflective process is varied and flexible and is not restricted to a textbook
or course of study. Subject matter may consist of any belief or knowledge that an individual brings to the reflective process. Any confusion, doubt, or contradictions associated with this belief or knowledge can become a catalyst for reflection. To Griffin, it is this doubt and perplexity which creates the problem to be examined. The objective of reflective teaching is to have students develop better grounded beliefs through reflective thinking.

Another important element of the reflective method emphasized throughout the literature is the critical examination of beliefs within a problematic situation. Dewey (1910) defines "problem" in terms of a felt difficulty that needs to be overcome in order to reach a goal or an end. In this sense a problem must be felt or internalized by the individual. Hunt and Metcalf (1966) explain that a "felt problem" must arouse students both intellectually and emotionally. The reflective teacher initiates the reflective process by creating situations which cause students to question their own beliefs or recognize conflicts between two or more beliefs that they hold. Griffin identifies two irreducible elements of reflection: "...a state of perplexity or doubt, and a search for facts which will reduce doubt (or induce belief, which is the same thing), in a degree sufficient to allow action to go forward. Anything that renders belief at all uncertain is a sufficient occasion for reflection" (Griffin, 1942).
Jewett also emphasizes that:

the beliefs of pupils are central to the reflective process and that the grounding of these beliefs in relevant evidence is a method by which reflection is carried forward. It may be reasonably assumed that students have many more beliefs than problems. It becomes the purpose of the teacher to alter these beliefs to the nature of hypotheses for the pupil. At that point, the reflective process can begin to operate. (Jewett, 1947)

According to the theory described above, teacher and student beliefs provide the basis on which reflective thought is developed in the classroom. The reflectively oriented teacher assumes responsibility for creating problematic situations which cause students to examine their beliefs and to ground them in evidence. To accomplish this the teacher must become aware of students' beliefs and must help them become aware of conflicts or incongruencies in their beliefs. The students must feel that a problem exists in order to desire conflict resolution.

Hunt and Metcalf explain that one way to cause students to examine and ground their beliefs is to confront them with contradictory evidence. "The most urgent problems will result when students become aware of evidence which questions some cherished belief...the basic technique used in exposing inconsistencies and confusion in belief is that of higher order questions to promote reflective thought" (Hunt and Metcalf, 1968). This type of questioning should require students to use thinking skills such as interpretation, application, analysis, synthesis and evaluation. Bloom (1956) has
developed a taxonomy of educational objectives that is related to this type of cognitive operation and Sanders (1966) has developed a series of questions that can be used by teachers to help students develop their thinking skills.

Summary

The traditional notion of subject matter as course content in a textbook is considered to be only a secondary source for reflective teaching. This is not to say that textbooks and traditional methods have no place in the reflectively oriented classroom, but the manner in which they are used is significantly different from traditional classrooms. Dewey (1910) explains, "...textbooks must be used as means and tools, not ends. They are useful to arouse questions and to supply information with which to answer them. But, when they are permitted to dictate or even dominate the conduct of recitation, the result is a dulling thought" (Dewey, 1919). Subject matter, then, is used as a means for promoting reflective thinking not as an end in itself. This is a distinguishing feature of the reflective use of subject matter.

Teaching Strategies

Cousins (1962), Cox (1961), and Massialas (1961) described and analyzed the methodological procedures followed by students dealing reflectively with problems. These researchers concluded that reflection in the classroom follows certain phases. The phases are not necessarily sequential, and there are many instances of overlap
and concurrency of phases. Massialas and Cox state that the primary implication these studies have for the teacher is that "reflective thinking can be effectively established within the classroom setting through the use of a pattern or a model with distinguishable phases. The teacher can introduce reflection into his classroom, or improve his present attempts at it, by recognizing and employing these phases" (Massialas and Cox, 1966).

Hunt and Metcalf (1955) and Beyer (1979) have developed the most comprehensive translation of reflective teaching into distinct phases. The following outline integrates complementary ideas from both of their models in order to provide an explanation of each phase in the reflective teaching process. The outline follows the process of reflective thinking that was described by Dewey and presented earlier in this chapter.

I. Identifying a Problem or Question

The teacher creates a conflict or helps students become aware of a problematic situation. The objective is to develop cognitive dissonance among students so that they will seek resolution. Hunt and Metcalf refer to this as "an intellectual jam," Beyer suggests the use of the following situations to create dissonance among students.

(a) an unpopular argument about a topic in which they are known to be quite interested;
(b) several conflicting opinions on the same subject
(or several solutions to a given problem);
(c) material that contradicts the biases or stereotypes
held by the students;
(d) an incomplete, mystery-type situation that fairly begs
for a solution. (Beyer, 1979)

II. Defining The Problem or Question

The teacher guides students through a discussion which focuses on
stating the central problem as simply and precisely as possible. The
teacher uses probing questions to help students define ambiguous
terms and to delimit the major problem or question. The major
question is reduced to a series of subordinate questions which when
answered will provide a comprehensive answer to the original question.
Thus, the problem is rendered more manageable through clarification
and made more meaningful by drawing upon and using students' own
ideas, opinions and beliefs.

III. Developing A Tentative Answer

Once doubt, confusion, or conflict motivates students to seek
resolution, the teacher guides the students in the development of
hypotheses designed to answer the question or problem. Hunt and
Metcalf suggest that the hypotheses may emerge from the students' own
thinking or may be suggested by the teacher.

If the teacher wishes students to develop their own hypotheses,
the teacher must be familiar with the data sources that can be used
to generate hypotheses. Beyer suggests the following sources that can be used by the teacher to help students generate hypotheses:

(a) Students' previous learning in the form of specific facts, generalizations, concepts, assumptions, biases, or prejudices that they feel may relate to the topic under consideration.

(b) Students' past experiences which provide some knowledge that they may draw upon to form hypotheses about a given topic.

(c) Sources outside the students may also provide data useful for generating hypotheses. Such data may be contained in the problematic situation that initiates a "reflective teaching lesson", or it may be presented by the teacher or collected by the students as soon as a problem or question has been defined for investigation. (Beyer, 1979)

IV. Testing A Tentative Answer

Hunt and Metcalf explain that the testing process is not meant to determine if hypotheses are true or false in any final sense. Rather, the purpose is to determine the degree of accuracy or inaccuracy of the hypotheses. The teacher's role is to guide classroom discussion and to help students to understand the proper basis for selection of evidential data which supports or refutes a hypothesis. Beyer refers to this as the evaluation of data:
the teacher must employ learning experiences in which students examine data to distinguish statements of accepted fact from statements of opinion and to identify unstated assumptions, evidence of bias, and examples of faulty logic. Students must determine the external and internal validity of the source itself: who created it, when, and why, and the author's sources, biases, and purposes. Students must also search for internal inconsistencies, for conclusions unsubstantiated by the evidence cited, and for cardstacking or emphasis on just one point of view. (Beyer, 1979)

V. Developing A Conclusion

The formulation of a conclusion requires a judgment regarding the validity or invalidity of the hypotheses under study. These judgments are based upon the evidence against which the hypotheses have been tested.

Hunt and Metcalf explain that the classroom environment must be permissive in the sense that the teacher does not use authority to dominate decisions. It is a "give-and-take" situation that allows all participants to make proposals and criticize proposals made by others. If the study reaches the point whereby accepted conclusions need to be reexamined, the teacher may wish to acquaint students with conclusions reached by experts in the field of study. These conclusions should also be evaluated in accordance with the evidence which supports them.

VI. Applying A Conclusion To New Data

Beyer refers to this last phase as providing effective closure in reflective teaching. In resolving the initial cognitive dissonance, some students may feel that they have not resolved their
conflict. They need to know if their conclusions are valid. To accomplish this the teacher may have students apply their conclusions to new data that relate to the original problem. If the conclusion helps students to analyze and understand the new data, the chances of its validity are increased.

This step allows students to cast their findings into generalizations. Applying students' generalizations in the analysis of a new, but similar, situation further tests their conclusions and gives meaning to what they have learned. Students have not learned a disparate assortment of facts, but a set of concepts and generalizations which can be used to analyze and interpret future situations and experiences. Generalizing and conceptualizing represent the more advanced levels of thinking and knowing.

**Summary**

The preceding review has identified the basic elements of the reflective teaching process and will serve operationally to define teaching behaviors associated with the process. Three major areas were analyzed for specific characteristics indicative of a reflective classroom. These areas included classroom climate, subject matter, and reflective teaching strategies. Reflective teaching behaviors identified in each of these areas will be incorporated into the observation instrument.
CHAPTER III

RESEARCH PROCEDURES

This chapter presents the procedures used to obtain data for the research questions posed in this study. The research procedures are presented under three major headings: 1) development of the observation instrument, 2) validation of the observation instrument, and 3) testing the reliability of the observation instrument.

Development of the Observation Instrument

The review of literature dealing with the theory and practice of reflective teaching describes three important components of the reflective teaching method. They include: 1) the reflective teaching process, 2) subject matter, and 3) classroom climate. The first area, the reflective teaching process, includes teaching strategies designed to guide students through the five steps of reflective thinking. Although the literature reviewed placed varying emphases on each step, there was agreement among the authors that all five steps were important for effective reflective teaching. A careful analysis of the literature was conducted in order to identify concepts and behavioral statements that describe important characteristics of each step in the reflective teaching process. These concepts and behavioral statements were translated into low-inference teaching behaviors and were defined operationally.
The following list presents the operationally defined low-inference teaching behaviors that were derived from the review of literature. Each behavioral item was classified according to its function within the five step reflective teaching process:

**REFLECTIVE TEACHING PROCESS**

**IDENTIFYING A PROBLEM**

1. **Asks divergent questions to identify a problem.**

   The teacher asks questions that confront students with problem situations. Divergent questions allow for a variety of answers. The teacher does not seek a single "right" answer, only plausible and sometimes best responses. The teacher may ask, for example, 'How might the U.S. improve her relations with the Soviet Union?' 'What would you predict would happen in Central America if Congress denies military aid to Nicaragua?' 'What effect will the dispute between Iran and Iraq have on the U.S. economy?'

   This behavior may be initiated by the teacher or it may occur in response to a student's state belief, opinion, idea, or question.
2. Uses materials to introduce conflicting data

The teacher uses newspapers, books, magazines, pictures, recordings, artifacts or other means that guide students to identify or discover a problem. For example, the teacher may read aloud two conflicting editorials on the subject of the new drunk driving laws. The teacher may show pictures that illustrate impoverished and wealthy lifestyles within the same city.

The teacher initiates this behavior to elicit questions and comments from the students concerning the conflict in data. Students' questions and comments serve to provide a focus on a specific problem or several problems.

3. Asks probing questions that identify inconsistencies or contradictions in the beliefs, opinions, or ideas of students.

The teacher, after listening to a student(s) express a belief, asks a question focusing on other beliefs that may be inconsistent with or contradicts the first belief. For example, the teacher may hear students concur that "Any form of censorship is unconstitutional and it is the government's responsibility to protect our freedom of speech." The teacher then asks the students, "Do you feel it is all right to spend tax dollars to provide police protection for the American Nazi Party to hold a rally in Skokie, Illinois?" Students who disagree with tax monies spent in this manner, or who don't feel that Nazis should be allowed in America, are forced to reevaluate the first belief. Thus, a problem is identified for investigation.

The teacher may directly solicit beliefs, opinions, or ideas about a specific topic, and then initiate this behavior, or it may occur in response to a student(s) comment.
4. **Asks students to state the problem/question in their own words.**

The teacher, after initiating a problematic situation, asks probing questions to help students narrow the focus of the investigation. For example, the teacher might ask, "What do you see as a problem?" "Why do you feel this is a problem?" "Can you phrase this problem into a question?" "What are some specific questions that you think need to be answered in order to solve this problem?"

The teacher may initiate this behavior or it may occur in response to a student's question or comment or some non-verbal cue from students indicating doubt, perplexity, or confusion.

5. **Asks students to define ambiguous or new terms to help make the problem or question clear and precise.**

The teacher asks questions about specific terms that may need to be defined and clarified so that the problem or question is clearly understood by all students. For example, if the problem/question to be investigated was, "What effects has technology had on American lifestyles?", the meanings of "technology" and "lifestyles" may need to be precisely defined in context of the investigation. The teacher could ask, "What kind of technology are we talking about?" "What do you mean by lifestyles?" "Are you referring to our present lifestyles, or those in the future or past?"

The teacher may initiate this behavior or it may occur in response to a student's question or comment concerning the problem/question.

6. **Presents students with a hypothesis to test.**

The teacher foregoes having students identify a problem and instead gives them a predetermined hypothesis that they can test against evidence. For example, the teacher might read a quote from a book, newspaper, or magazine and ask students to support or refute with evidence.

7. **Asks divergent questions to solicit hypotheses.**

The teacher asks questions that require students to offer an opinion or guess about possible solutions to a problem/question.
Students' responses are usually based on past learning or personal experiences. For example, the teacher may ask, "What are some possible causes of the Viet Nam War?" "What affect might the present cold war have on world peace?" "What foreign policy could we expect from Jesse Jackson?"

The teacher may initiate this behavior or it may occur in response to a student's question or comment.

8. **Presents data and then asks questions to solicit hypotheses.**

The teacher presents newspapers, books, magazines, pictures, recordings, word lists, diaries or other data sources that can be used to generate hypotheses. The teacher then asks questions that require students to make inferences, predictions, classifications, or state relationships. This may be done on an individual basis or in small or large group sessions.

The questions asked by the teacher may be phrased in the following manner: "What do these pictures indicate about life in China?" "Based on these newspaper articles who do you think will win the Democratic nomination?" "What time period is this music and art work from?" "Why did Benjamin Franklin write this comment in his diary?"

The teacher initiates this behavior to elicit hypotheses from the students concerning the problem/question. Student's hypotheses serve to provide a focus for gathering evidence.

9. **Asks probing questions to help students identify and locate sources that could be used to generate hypotheses.**

The teacher, after having students identify and clarify a problem/question, asks students questions that will guide them to sources that relate to the problem/question. For example, a teacher may ask, "Where could we find more information about the American Indian?" "How could the Museum of History help us find out more about American Indians?" "Can you think of other sources or places that would provide us with information?" "What kind of information do we need to find in order to answer our problem/questions?"

10. **Provides time for students to gather sources and formulate hypotheses.**

The teacher, once students have identified reasonable and accessible sources, encourages students to locate these sources
and investigate them for hypotheses related to the problem/ question. For example, the teacher may allow students to gather information in a library, or browse through materials that are already provided in the classroom.

TESTING HYPOTHESES

11. **Asks students to suggest possible evidence that may support or refute their hypotheses.**

   The teacher, once students have formulated clearly defined hypotheses, asks students to determine what kind of evidence they would expect to exist if their hypotheses were true and if their hypotheses were false. For example, the teacher may ask, "What evidence would you need to find that will help prove the hypothesis that most early American Indians were farmers?" "What evidence would suggest that most early American Indians were not farmers?"

   The teacher may initiate this behavior through a question/answer discussion, or it may be initiated as a writing assignment for individuals or small groups.

12. **Asks probing questions to help students identify and locate sources that could be used to generate evidence.**

   The teacher, after having students identify supportive and non-supportive evidence, will ask students questions that will guide them to sources that relates to the evidence they are looking for. For example, a teacher may ask, "Where could we find evidence about the occupations held by early American Indians?" "What kind of books might we refer to?" "Can you think of other sources or places that might tell us about early American Indian occupations?"

   This behavior may be initiated by the teacher or it may occur in response to a student question or comment.

13. **Provides time for students to locate sources and gather evidence.**

   The teacher, once students have identified reasonable and accessible sources, allows students to locate these sources and investigate them for evidence related to the hypotheses being tested. For example, the teacher may allow students to conduct a survey, interview people, gather information in a library, or use materials that are already provided in the classroom.
14. Presents data and then asks questions that require students to test their hypotheses.

The teacher presents data sources that can be used to generate evidence which supports and/or refutes the hypotheses. The teacher then asks questions that require students to identify supportive and non-supportive evidence, evaluate the validity of the evidence and its source, and state relationships between the evidence and the hypotheses. For example, the teacher may ask, "Read this letter written by Benjamin Franklin. Can you find evidence that supports or refutes our hypothesis about slavery in Colonial America?" "Do you think the information contained in this letter is accurate?" "How can we be sure?" "Based on the evidence you've cited so far, what can you tell me about the accuracy of our hypothesis?"

The teacher initiates this behavior to have students identify and evaluate potential evidence that can be used to support or refute hypotheses. The evidence serves to provide a basis for developing conclusions.

15. Asks probing questions which lead students to evaluate the validity of the evidence they have collected.

The teacher, once students have collected evidence to support or refute their hypotheses, may ask students to prove that the evidence collected is factual, not just opinions, biases, or assumptions. For example, the teacher may ask, "What other sources have you found that support this evidence?" "Have you compared and contrasted this evidence with other sources?" "What did you find out?" "Is this evidence current?" "Who wrote it?" "When was it written and why?" "Is your evidence consistent?"

The teacher may initiate this behavior through a question/answer large group discussion, or it may occur as the teacher works with individuals or small groups.

16. Asks questions that require students to relate the evidence to the hypotheses being tested.

The teacher will ask students how the evidence they have collected either supports or refutes the hypotheses being tested. For example, the teacher may ask, "What evidence did you find that provides support for the hypothesis that early American Indians were farmers?" "Why do you think that this evidence actually proves that they were farmers?" "What evidence did you find that might refute our hypotheses?"
The teacher may initiate this behavior through a question/answer discussion, or it may be initiated as a writing assignment for individuals or small groups.

17. Asks questions that require students to state conclusions concerning the initial problem/question based upon the valid and invalid hypotheses they have tested.

The teacher, after students have tested their hypotheses, will ask divergent and evaluative questions to guide students in developing conclusions. For example, the teacher may ask, "Which hypotheses provided an accurate description about the negative effects technology has had on American lifestyles?" "What evidence do you have that supports this conclusion?" "Which hypotheses did not provide an accurate description?" "What evidence do you have that supports this conclusion?" "What can we definitely state about the effects technology has had on American lifestyles?"

The teacher initiates this behavior to elicit conclusions for the students concerning the initial problem/question. Students accepted or refuted hypotheses serve to provide an information base for developing these conclusions. The teacher may initiate this behavior through a large or small group question/answer discussion, or it may be initiated as a writing assignment.

18. Presents new data and asks students to find evidence that supports or refutes their conclusions.

The teacher introduces new data that is relevant to the initial problem/question but has not been used by students to develop their conclusions. The teacher will ask the students how the new data either supports or refutes their conclusions. For example, the teacher may introduce two medical journals that ask, "What evidence can you find that provides support for the conclusion that advanced technology has increased our life expectancy?"

The teacher initiates this behavior to elicit further evidence which may support or refute the students conclusions. The teacher may initiate this behavior through a large or small group question/answer discussion, or it may be initiated as a writing assignment.
The second area, subject matter, was also described in the literature as a very important component of reflective teaching. The primary purpose of subject matter is to promote reflective thinking. In this sense, the subject matter of a lesson is dictated by its relevancy to the various steps throughout the reflective teaching process. Subject matter then is not conceived as consisting of primarily content in a textbook or content in a course of study. Instead, it was conceived more broadly to include any beliefs, attitudes, and opinions of students' that can be used to identify problems and develop hypotheses. Data from a variety of sources could also be used as evidential material to test hypotheses and formulate conclusions.

This description of subject matter is consistent with Dewey's conception of what reflective teaching and learning ought to be. In his writings on education, Dewey consistently described subject matter and the teaching process as an integrated method of education. Theorists who further developed Dewey's ideas have been careful to describe subject matter as interrelated within the five step process of reflective teaching. This integration of subject matter within the teaching process was evident throughout the review of literature. A close scrutiny of the literature indicates that the concepts and behavioral statements that describe the use of subject matter were directly related to each step in the reflective teaching process. Therefore, the behavioral items that relate to the subject matter
area were logically incorporated within the reflective teaching process. The preceding list of operationally defined low-inference teaching behaviors include behavioral items that relate to the use of subject matter within the reflective teaching process.

The third area, classroom climate, is emphasized throughout the literature as another important component of reflective teaching. An intellectually open classroom climate is described in the literature as most conducive for promoting reflective thought among students. In order for students to express and reflectively examine their ideas, beliefs, and opinions they need to feel comfortable and secure within the teaching-learning environment. A reflective classroom climate is characterized in the literature as one in which the teacher facilitates an open discussion, establishes and maintains rapport with students, and demonstrates empathy and acceptance with students' ideas, opinions, and beliefs. Concepts and behavioral statements that were used in the literature to describe this type of classroom climate are translated into low-inference teaching behaviors and are defined operationally. The following list presents the operationally defined low-inference teaching behaviors that are derived from the review of literature. Each behavioral item is classified according to the function it serves in establishing a classroom climate conducive for reflective thought:
Classroom Climate

FACILITATES AN OPEN DISCUSSION

1. **Arranges chairs in seminar or small group style.**

   The teacher asks students to arrange their chairs in a circle or semicircle so that communication between students and the teacher will be face-to-face. Or, the teacher may have already arranged the chairs in a circle or semi-circle.

2. **Directs student-to-student interaction.**

   The teacher asks students to comment on each other's opinions and ideas. For example, the teacher may say, "John said that Abraham Lincoln used the issue of slavery merely to further his political career. He, in John's opinion, was a political opportunist. How do the rest of you feel about this statement?"

   The teacher initiates this behavior in response to a student's comment.

3. **Directs the discussion to many students, not just a few.**

   The teacher asks questions and solicits opinions from a wide variety of students to ensure that a few students do not monopolize the discussion.

   The teacher may initiate this behavior by randomly calling on students or it may occur in response to non-verbal cues from students indicating that they want to participate.

4. **Talks briefly and then stops so that h/she does not monopolize the discussion.**

   The teacher makes most explanations, reviews, and responses to students questions or comments brief and to the point. He deliberately pauses and provides time for students to respond and/or ask questions.

   The teacher may directly solicit comments and/or questions from students, or may pause for a while and give some non-verbal cue to students indicating they are invited to begin discussion.
5. Allows time (pauses) for students to reflect on the topic being discussed.

   The teacher deliberately pauses after important comments or questions to allow students time to think. The teacher may say to students "Let's stop and think about this for awhile." or "This requires serious consideration, let's think before we make any hasty judgments."

   The teacher may initiate this behavior after introducing some aspect of content, or it may occur in response to a student's question or comment.

6. Points out what is relevant and not relevant to the discussion.

   The teacher deliberately draws students' attention to those aspects of the discussion that are important and relevant, and courteously draws attention away from irrelevant discussion. The teacher may say, for example, "That is a very important observation, let's pursue it further." In the case of an irrelevant comment, "That is an interesting comment but let's re-direct our attention to the main topic."

   The teacher initiates this behavior in response to a student's question or comment.

EMPATHY AND ACCEPTANCE

7. Gives examples that relate to what the student is saying.

   The teacher describes or explains a similar instance related to what a student has just described or explained. The teacher may say, for example, 'A similar situation might be...'; 'This reminds me of...'; 'Would this example be an accurate illustration of what you are saying...'; etc.

   This behavior is initiated in response to a student's comment or question. It serves to clarify students' comments and opinions and provides positive reinforcement that students' comments and opinions are understood and accepted.

8. Listens attentively (without interruptions) while students express their ideas, opinions, questions.

   The teacher pays close attention to what students are saying and provides non-verbal cues like nodding his head and maintaining eye contact to encourage continuation of expressions.
The teacher initiates this behavior in response to students ideas, opinions, questions.

9. Provides students with corrective feedback in a non-threatening manner.

The teacher uses data to help students discover that what they are saying may be wrong. Rather than presenting himself as the subject matter authority, the teacher directs students to data sources which contradict what the student is saying. The teacher then asks students to explain the contradiction. This behavior allows students to retain the integrity of changing their own minds and keeps the quest of knowledge in spirit with true reflective thinking.

The teacher initiates this behavior in response to students ideas, opinions, comments.

10. Makes remarks which indicate that the students' comments are appreciated, accepted and subject to analysis.

The teacher provides students with positive feedback when they participate in discussions and at the same time facilitates a critique or analysis of their comments. The teacher might say, for example, 'Thanks for that interesting observation.' 'You seem to have done a lot of reading on the subject.' 'Let's examine how your ideas compare with others in this class and the authorities in the field.'

The teacher initiates this behavior in response to students ideas, opinions, comments.

11. Redirects the focus of discussion when student(s) appear to be uncomfortable or self-conscious.

The teacher, on observing a student's nervous reaction to a question or comment, provides the student with an option not to answer the question or not offer a comment. The teacher may say, for example, 'Think about it for awhile and I'll get back to you,' or he might ask a general question to the whole class, 'How do the rest of you think about...'

The teacher initiates this behavior whenever a student gives verbal or non-verbal cues that he/she is becoming very embarrassed or uncomfortable with the discussion.
ESTABLISHES AND MAINTAINS RAPPORT WITH STUDENTS

12. **Makes non-threatening humorous remarks when relevant.**

   The teacher will ease the tension of a discussion or relax students prior to a discussion with some anecdote of humor.

   This behavior is initiated to establish a more relaxed climate so that students feel at ease to express themselves and to enhance the student-teacher relationship.

13. **Addresses individual students by their names with friendly mannerisms such as smiles, approving nods, pats on the back, etc.**

   The teacher conveys to the students through verbal and non-verbal behaviors that they are liked and that their participation in class is respected and appreciated.

   The teacher initiates this behavior prior or after class during informal conversation or during classroom discussion.
The preceding behavioral items, classified into the categories of the reflective teaching process and classroom climate, are considered to be important teaching behaviors for reflective teaching. These teaching behaviors and their operational definitions are incorporated into the first draft of the observation instrument. The first draft of the instrument was subsequently developed into a survey questionnaire that would serve to collect data regarding the content validity of each behavioral item contained in the instrument. The questionnaire also solicited comments and suggestions regarding the clarity of each behavioral item and its operational definition. This information was then used to revise and refine the instrument into a clearer and more understandable form (See Appendix A). The following section discusses the detailed procedures that were followed in establishing the content validity of the observation instrument.

**VALIDATION OF THE OBSERVATION INSTRUMENT**

To establish content validity, a panel of social studies educators evaluated the importance of each reflective teaching behavior contained in the instrument.

Panel members were selected based upon the following criteria:

1. The person should have demonstrated an understanding of reflective teaching through past writing, teaching, or projects concerned with the development of reflective teaching.
2. The person should be committed to the theory and practice of reflective thinking as an important objective in education.

3. The person should, if possible, be currently active in social studies education or related fields.

4. The person selected should represent different facets of education including elementary, secondary, and higher education.

5. In addition to the four criteria listed above, the person should be recommended by a dissertation committee member who is familiar with the individual's work or educational philosophy.

Thirty educators who met the above criteria were sent survey questionnaires and letters that explained the purpose of the study and requested their participation as evaluators of the observation instrument (See Appendix A and B).

The purpose of the survey questionnaire

1. Establish the content validity of the reflective teaching behaviors and their operational definitions.

2. Solicit corrective feedback in regards to wording or functional interpretations of the behaviors and their operational definitions.

3. Solicit any additional teaching behaviors that are important to reflective teaching not included on the initial list.

To establish content validity, the selected evaluators evaluated the importance of thirty-one reflective teaching behaviors that were derived from the review of literature. A Five-point Likert-type scale was used to identify the importance of each behavior. The scale ranged on a continuum from a numeral -1- indicating Never Important,
to a numeral -5- indicating Always Important. The evaluators were asked to circle the numeral which best corresponded with their perception of the importance of each teaching behavior. Individual scales were presented with each teacher behavioral item. A mean score was computed for each item, and any teaching behavior that received a rating of 2.9 or less was considered not important to reflective teaching and was deleted from the list.

A space for comments and suggestions was provided to solicit more information regarding the clarity and/or importance of each teaching behavior and its operational definition. At the end of the survey more space was provided so that the evaluators could list any additional teaching behaviors they perceived as important to reflective teaching.

Revisions, deletions, and additions of the teaching behaviors and operational definitions were made, based on the results of the evaluations and suggestions that were solicited on the survey questionnaire. Teaching behaviors that received a mean rating of 3.0 or more were incorporated into the second draft of the observation instrument.

The second draft of the instrument was pilot-tested to determine if the behavioral items could be directly observed and identified in videotaped teaching episodes. The investigator and three doctoral candidates at The Ohio State University served as observers for this phase of the study. All four observers were social studies educators
and considered knowledgeable about reflective teaching. It was determined that knowledge of reflective teaching was important for making informed judgements regarding the content validity and clarity of the observation instrument.

The investigator and three observers reviewed and discussed each behavioral item and its operational definition. On items where an agreement or concurrence of meaning could not be reached, the behaviors and operational definitions were further clarified and refined. Next, five videotaped teaching episodes that were especially designed by the investigator to demonstrate reflective teaching behaviors were viewed by the observers. The observers were instructed to tally every instance that a reflective teaching behavior, as designated on the observation instrument, occurred during a teaching episode. This observation format is referred to as a sign observation system which allows the observer to record the frequency of occurrence of certain teaching behaviors (Dunkin and Biddle, 1974). Any discrepancies in the tallies of observer recordings were reviewed. In instances in which certain behavioral items seemed to be unclear or observational procedures were found not to be working efficiently, they were discussed and the necessary editing or instrument modification was made.

The revised form of the observation instrument, observational procedures, and the method used to assess the reliability of the instrument are presented in the next section of this chapter.
Assessing The Reliability Of The Observation Instrument

Observer Training Procedures

Over a four-day period, ten observers were trained by the investigator in the use of the observation instrument. Five of the observers were graduate students in Language Arts Education, three were graduate students in Math/Science Education, and two were graduate students in Social Studies Education.

The observer training sessions served the following purposes:

a) To familiarize the observer with the operational definitions of the low-inference reflective teaching behaviors.

b) To train the observers to use the observation instrument according to established observational procedures.

c) To measure the agreement and consistency between observers when using the instrument to rate videotaped lessons.

The investigator and ten observers reviewed and discussed the operational definitions, provided in the instrument, in an attempt to acquire a sense of agreement and understanding of the meaning of each low-inference behavior. Once a consensus of each behavior was reached, the observers practiced using the observation instrument to record the occurrence of reflective teaching behaviors in videotaped teaching episodes. After the practice sessions six videotaped teaching episodes that were specifically designed by the investigator to demonstrate reflective teaching behaviors were viewed by the
observers. The observers were instructed to tally every instance that a reflective teaching behavior, designated on the observation instrument, occurred during a teaching episode. The instrument used during this phase of the study had been adequately revised in order to accommodate the efficient and reliable recording of reflective teaching behaviors. An outline of this instrument is presented on the following page. The behavioral items are presented in Appendix C.

In order to determine if the observers were adequately trained, measures of agreement were obtained between each observer and an established criterion. The investigator had previously rated all the tapes used in this study, and these ratings served as the criterion for measuring observer agreement. Scott's coefficient (1955) was used to determine agreement and consistency between the observers and the criterion (Frick and Semmel, 1978). When relatively high observer agreement (π ≥ .80) was obtained across two consecutive observed teaching episodes, it was accepted as an indication of adequate training. The trained observers who met this criterion were included in the formal observation phase of the study.

**Formal Observation Procedures**

Eight of the ten trained observers met the established criterion of a coefficient score greater than or equal to .80 across two consecutive observer teaching episodes. These eight observers took part in the formal observation phase of the study.
Over a five-day period the eight observers viewed and rated eight teaching episodes by following the procedures described below:

1) The observers viewed each videotaped teaching episode without recording any teaching behaviors.

2) The observers then viewed the same teaching episode a second time, using the developed observation instrument to record each occurrence of a reflective teaching behavior.

3) If deemed necessary by the observer, a repeated observation of any teaching episode, or segment of a teaching episode was conducted in order to clarify any questionable ratings.

To assess the reliability measure of observer agreement, Scott's coefficient ($\pi$) was computed for each of the eight observers on each of the eight teaching episodes. The investigator's ratings of the same eight teaching episodes were used as the criterion measure for observer agreement. A reliability coefficient $\geq$ .80 was considered an acceptable measure for determining the agreement and consistency of the observers when using the observation instrument. The observer agreement reliability coefficients that were computed for this phase of the study are reported in Chapter IV.
CHAPTER IV

RESULTS

Introduction

This chapter present a description and interpretation of the data obtained from the validity and reliability measurements of the observation instrument. The results of these measurements are reported under two major headings: 1) Analysis of the Content Validity Data, and 2) Analysis of the Reliability Measurements.

ANALYSIS OF THE CONTENT VALIDITY DATA

Survey Questionnaire Results

To establish the content validity of the instrument, a survey questionnaire was mailed to a select panel of thirty educators knowledgeable about reflective teaching. The procedures used to develop the survey questionnaire and the criteria used to select the panel of educators are described in detail in Chapter III of this study. A copy of the survey questionnaire with directions explaining its use and a copy of the letter requesting participants to perform as evaluators are found in Appendix A and B, respectively.

Eighteen of the thirty, or sixty percent, of the questionnaires mailed out were returned. Each evaluator evaluated the degree of importance the identified teaching behavioral items have in relationship to the reflective teaching process. A five-point Likert type
scale was used to indicate the importance of each teaching behavior. The scale ranged on a continuum from a numeral -1- indicating Never Important, to a numeral -5- indicating Always Important. The evaluators circled the numeral which best corresponded with their perception of the importance of each teaching behavior. Mean scores and standard deviations of the evaluators' responses to the survey questionnaire are shown in Table 1. The first column labelled Teaching Behaviors, numbered one through thirty-one, contains the identification of the thirty-one behavioral items corresponding to the questionnaire. The row of numerals that follows each behavioral item represents the degree of importance attributed to that item on the basis of the five-point scale mentioned above. The last two numerals in each row represents the mean score and standard deviation calculated for that behavioral item. A mean score of 3.0 or greater was established as the standard for determining which teaching behaviors would be included in the observation instrument. (See Table 1.)

An examination of the mean scores contained in Table 1 indicates that twenty-six of the thirty-one behavioral items met the criterion for selection for use in the instrument. These twenty-six behaviors were incorporated into the first draft of the observation instrument. Five behavioral items (items 6, 10, 13, 16, and 19) which did not satisfy the criterion for selection were not included in the instrument.
The evaluators who rated the above five behavioral items as being unimportant to reflective teaching did not provide explanations for their ratings. Space was provided on the survey questionnaire for the evaluators to offer comments and suggestions explaining their responses to each behavioral item. However, due to the length of the questionnaire a substantial amount of time was required to complete it. Therefore, the majority of evaluators used only the Likert scale to indicate their responses. The investigator can assume then, that behavioral items 6 and 16 were most likely rated unimportant to reflective teaching because both of these behaviors exemplify teacher dominated instruction which does not facilitate student centered thinking and learning. Behavioral items 10, 13, and 19 dealt with managerial tasks such as arranging chairs and providing time for students to locate resources. These items might have been rated as unimportant to reflective teaching because they are not necessarily needed in order for reflective thinking to occur among students.
<table>
<thead>
<tr>
<th>Item No.</th>
<th>Teaching Behaviors</th>
<th>Likert Rating</th>
<th>Mean</th>
<th>Standard Deviation</th>
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<tbody>
<tr>
<td>1.</td>
<td>Asks divergent questions which allow students to identify problems or questions concerning the subject matter</td>
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<td>2.</td>
<td>Uses materials to introduce conflicting data</td>
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<td>3.</td>
<td>Asks probing questions which identify inconsistencies or contradictions in the beliefs, opinions, or ideas of students</td>
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<td>4.</td>
<td>Asks students to state the problem or question in their own words</td>
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<td>5.</td>
<td>Asks students to define or clarify ambiguous and new terms to help make the problem or question clear and precise</td>
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<td>0.71</td>
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<td>6.</td>
<td>Presents students with a hypothesis to test</td>
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<td>7.</td>
<td>Asks divergent questions to solicit hypotheses</td>
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<td>8</td>
<td>Presents data and then asks questions to solicit hypotheses</td>
<td>4 3 4 4 5 4 3 4 2 5 4 4 4 5 5 3</td>
<td>4.0</td>
<td>0.82</td>
</tr>
<tr>
<td>9</td>
<td>Asks probing questions to help students identify and locate sources that could be used to generate hypotheses</td>
<td>5 3 3 5 4 4 3 3 4 5 5 4 4 4 5 5 3</td>
<td>4.1</td>
<td>0.81</td>
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<tr>
<td>10</td>
<td>Provides time for students to gather sources and formulate hypotheses</td>
<td>3 3 3 3 2 2 2 2 4 3 2 3 4 4 4 2</td>
<td>2.9</td>
<td>0.78</td>
</tr>
<tr>
<td>11</td>
<td>Asks students to suggest possible evidence that may support or refute their hypotheses</td>
<td>5 4 4 5 4 4 4 5 5 4 4 5 5 5 3</td>
<td>4.4</td>
<td>0.59</td>
</tr>
<tr>
<td>12</td>
<td>Asks probing questions to help students identify and locate sources that could be used to generate evidence</td>
<td>4 4 3 4 3 4 2 2 5 5 5 3 4 5 4 3 2</td>
<td>3.7</td>
<td>1.00</td>
</tr>
<tr>
<td>13</td>
<td>Provides time for students to locate sources and gather evidence</td>
<td>3 3 3 2 3 2 2 3 2 3 2 2 3 4 2 2</td>
<td>2.5</td>
<td>0.60</td>
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<tr>
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<td>Presents data and then asks questions that require students to test their hypotheses</td>
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<td>Likert Ratings</td>
<td>Mean</td>
<td>Standard Deviation</td>
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<td>------------------------------------------------------------------------------------</td>
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<td>--------------------</td>
</tr>
<tr>
<td>15.</td>
<td>Asks probing questions which lead students to evaluate the validity of the evidence they have collected</td>
<td>5  5  4  4  5  4  3  5  4  4  5  5  5  4  4  4  5  5  4</td>
<td>4.1</td>
<td>0.66</td>
</tr>
<tr>
<td>16.</td>
<td>Asks questions that require students to relate the evidence to the hypotheses being tested</td>
<td>2  2  3  4  3  2  3  4  4  2  2  4  2  2  4  2  2</td>
<td>2.7</td>
<td>0.87</td>
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<td>17.</td>
<td>Asks questions that require students to state conclusions concerning the initial problem or question based upon the valid and invalid hypotheses they have tested</td>
<td>4  4  4  4  5  3  5  2  5  5  4  3  5  4  5  5  4</td>
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<td>0.83</td>
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<td>18.</td>
<td>Presents new data and asks students to identify evidence that supports or refutes their conclusions</td>
<td>5  4  3  4  5  4  4  4  5  3  4  4  5  5  3  5  4</td>
<td>4.2</td>
<td>0.67</td>
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<td>19.</td>
<td>Arranges chairs in seminar or small group style</td>
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<td>2.7</td>
<td>0.65</td>
</tr>
<tr>
<td>Item No.</td>
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<td>Likert Ratings</td>
<td>Mean</td>
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</tr>
<tr>
<td>20.</td>
<td>Directs student to student interaction</td>
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<td>0.78</td>
</tr>
<tr>
<td>21.</td>
<td>Directs the discussion to many students not just a few</td>
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<td>4.4</td>
<td>0.85</td>
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<td>22.</td>
<td>Talks briefly and then stops so that he does not monopolize the discussion</td>
<td>4 5 3 4 5 4 2 5 2 4 4 2 4 5 5 5 5 3</td>
<td>3.9</td>
<td>1.10</td>
</tr>
<tr>
<td>23.</td>
<td>Allows time (pauses) for students to reflect on the topic being discussed</td>
<td>4 5 3 3 5 5 5 5 4 4 5 4 5 5 5 5 5 5 4</td>
<td>4.5</td>
<td>0.69</td>
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<tr>
<td>24.</td>
<td>Points out what is relevant and not relevant to the discussion</td>
<td>4 3 3 4 4 4 4 3 5 4 5 4 5 5 5 5 4 5 3 4 5 3</td>
<td>3.9</td>
<td>0.71</td>
</tr>
<tr>
<td>25.</td>
<td>Gives examples that relate to what the student is saying</td>
<td>5 4 3 4 3 5 4 4 4 4 5 4 5 5 5 5 3 5 4</td>
<td>4.2</td>
<td>0.69</td>
</tr>
<tr>
<td>26.</td>
<td>Listens attentively (without interruptions) while students express their ideas, opinions, questions</td>
<td>3 5 3 5 5 4 3 5 4 5 5 5 4 5 5 5 5 5 4</td>
<td>4.4</td>
<td>0.76</td>
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<td>27.</td>
<td>Provides students with corrective feedback in a non-threatening manner</td>
<td>5 5 4 5 5 5 4 4 5 5 4 5 4 5 5 5 5 5 3</td>
<td>4.6</td>
<td>0.59</td>
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TABLE 1 (Continued)

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<th>Likert Ratings</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>28.</td>
<td>Makes remarks that indicate that the students' comments are appreciated, accepted, and subject to analysis</td>
<td>4 4 3 5 4 4 3 3 5 5 5 4 5 5 5 5 5 3</td>
<td>4.3</td>
<td>0.80</td>
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<td>29.</td>
<td>Redirects the focus of discussion when student(s) appear to be uncomfortable or self conscious</td>
<td>5 3 3 5 4 5 4 4 3 4 4 5 5 5 4 5 3</td>
<td>4.0</td>
<td>0.82</td>
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<tr>
<td>30.</td>
<td>Makes non-threatening humorous remarks when relevant</td>
<td>4 4 3 3 5 4 4 3 2 5 4 4 3 5 5 5 2</td>
<td>3.8</td>
<td>0.98</td>
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<tr>
<td>31.</td>
<td>Addresses individual students by their names with friendly mannerisms such as smiles, approving nods, pats on the back, etc.</td>
<td>4 5 3 5 5 5 4 2 5 4 5 4 5 5 5 4 3</td>
<td>4.3</td>
<td>0.65</td>
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</table>
An examination of the standard deviations for behavioral items shows that variability in evaluation responses to the items on the questionnaire was fairly consistent among the majority of the eighteen evaluators. There was, however, one evaluator who consistently rated all the behavioral items low. Due to the small number of evaluators, the low ratings by the one evaluator significantly affected the standard deviation scores. A comparison of the variability in evaluators' responses on individual behavioral items revealed that for the thirty-one items the differences in standard deviation values ranged between 0.59 to 1.10.

**Pilot Test Results**

The first draft of the instrument was pilot-tested to determine if the behavioral items could be directly observed and identified in an actual taped teaching episode. This involved using the observation instrument to identify reflective teaching behaviors in videotaped teaching episodes. The investigator and three doctoral candidates at The Ohio State University served as observers for this phase of the study. All four observers were social studies educators and considered knowledgeable about reflective teaching. It was determined that knowledge of reflective teaching was important for making informed judgments regarding the content validity and clarity of the observation instrument.

Five videotaped teaching episodes that were specially designed by the investigator to demonstrate reflective teaching behaviors
were viewed and rated by the observers. The observers were instructed to tally every instance that a reflective teaching behavior, as designated on the observation instrument, occurred during a lesson. This observation format is referred to as a sign observation system which allows the observer to record the frequency of occurrence of certain teaching behaviors (Dunkin and Biddle, 1974).

The ratings of the five taped episodes by the four observers are presented in Tables 2-6. Each table contains observer identification letters A, B, C, and D on the vertical axis. The classification numbers from one to twenty-six on the horizontal axis identify the reflective teaching behaviors contained in the instrument. These tables facilitated the identification of observer agreement and disagreement regarding the occurrence of reflective teaching behaviors. (See Tables 2-6.)

The investigator and observers reviewed and discussed the discrepancies in the ratings of the five teaching episodes identified in Tables 2-6. The behavioral items that had proven to be unclear or confusing were carefully reevaluated. Some of the behavioral statements were found to be composites of more specific teaching behaviors, and as such, could not be easily observed or their occurrence recorded with reliability. For example, the behavioral statement "Asks students to define ambiguous or new terms to help make the problem or question clear and precise" was found to contain
### TABLE 2

**Observers Recordings of Reflective Teaching**

**Behaviors in Teaching Episode No. 1**

**During Pilot Test**

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<tr>
<th>Observers</th>
<th>Teaching Behaviors</th>
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</tr>
<tr>
<td>B</td>
<td>7 0 1 1 2 6 3 0 0 0 1 1 0 0</td>
</tr>
<tr>
<td>C</td>
<td>7 0 0 2 2 5 3 1 1 0 0 0 0 0</td>
</tr>
<tr>
<td>D</td>
<td>5 1 1 2 2 4 2 0 0 0 0 0 0 0</td>
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<td>0 3 13 4 0 0 4 15 0 19 0 0 3</td>
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</tr>
<tr>
<td>D</td>
<td>0 3 12 4 0 0 4 13 0 15 0 0 3</td>
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</tbody>
</table>
TABLE 3

OBSERVERS RECORDINGS OF REFLECTIVE TEACHING

BEHAVIORS IN TEACHING EPISODE No. 2

DURING PILOT TEST

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<td>C</td>
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TABLE 4

OBSERVERS' RECORDINGS OF REFLECTIVE TEACHING BEHAVIORS IN TEACHING EPISODE NO. 3 DURING PILOT TEST

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### Table 5

**Observers Recordings of Reflective Teaching Behaviors in Teaching Episode No. 4 During Pilot Test**

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TABLE 6

OBSERVERS RECORDINGS OF REFLECTIVE TEACHING BEHAVIORS

IN TEACHING EPISODE No. 5

DURING PILOT TEST

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TABLE 6 (Continued)

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another behavioral dimension: "Asks students to define ambiguous or new terms not directly related to the problem or question."

In such instances in which behavioral statements were found to be unclear, the statements were discussed and were edited when necessary.

A further examination of Tables 2-6 reveals that the disagreements regarding the occurrence of reflective teaching behaviors were mainly ones of frequency counts. In other words, the observers were fairly consistent in classifying the teaching behaviors but had problems in accurately recording the frequency of the behaviors. This problem led to a discussion of how observational procedures and means by which the instrument could be altered into a more efficient and more reliable recording tool. Again, in instances whereby behavioral items or observational procedures were found not to be working efficiently, they were discussed and the necessary editing or instrument modification was made. The revised instrument is presented in Chapter III.

**ANALYSIS OF THE RELIABILITY MEASUREMENTS**

**Observer Training Results**

Ten observers were trained to rate videotaped teaching episodes, using the revised reflective teaching observation instrument. (The training procedures are described in detail in Chapter III of this study.) Five of the observers were graduate students in Language
Arts Education, three were graduate students in Math/Science Education, and two were graduate students in Social Studies Education. Unlike observers for the pilot test, the observers for this stage were not selected on the basis of their familiarity with the reflective teaching process. The reason for this was that the purpose of this phase of the study was not to judge the validity or to revise the observation instrument. Rather, the purpose was to assess the reliability of observer agreement with the criterion measure. If reliability is to be tested with validity, any trained observer should be able to use the instrument accurately.

Coefficients of reliability for observers should be calculated as a test of agreement on the behaviors being viewed. High reliability usually indicates that the system is clear and precise since most of the observers call a behavior by the same name or code almost every time they see it.

Measures of observer agreement for this study were determined by using Scott's coefficient (π) (Scott, 1955). Procedures employed for computing reliability estimates for the observational instrument are described in Chapter III. Agreement measures between the observers and the criterion were computed for six observed teaching episodes. When relatively high observer agreement with the criterion measure (π > .80) was obtained across two consecutive observed teaching episodes, it was accepted as satisfactory evidence of adequate training (Frick and Semmel, 1978).
Table 7 presents the reliability coefficients calculated for each observer during the training sessions. The first row labelled A through J contains the identification letters used to identify the ten observers. The top column of numerals 1-6 identify the six teaching episodes that were used to measure observer agreement.

**TABLE 7**

**CRITERION-RELATED RELIABILITY COEFFICIENTS CALCULATED FOR OBSERVERS DURING TRAINING SESSIONS**

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</table>
The indices obtained for the six lessons as given by Scott's coefficient ranged from .55 to .84. It was noted during the training and actual data collection period that the lower indices of observer agreement were obtained by observers who were unfamiliar with the concept of reflective teaching. It was believed that higher reliability scores could have been achieved if the training sessions were of a longer duration. Table 7 shows that most of the observers gradually increased in their reliability scores for teaching episodes 4, 5, and 6. These teaching episodes were viewed during the latter portion of observer training. It appears that the observers at this point had acquired a clearer understanding of reflective teaching and the observational procedures.

Eight of the ten observers met the criterion of obtaining a reliability coefficient greater than or equal to .80 across two consecutive observed teaching episodes. Observers A, B, C, E, F, G, H, and J were all used for reliability assessment purposes during the formal observation phase of this study. Only observers D and I consistently produced scores below the established criteria of .80. Discrepancies between their ratings and those of the investigator who's ratings served as the criterion, were discussed but were not resolved. It was determined that observers D and I were either inadequately trained or unable to be trained; therefore they were not included in the formal observation phase of the study.
Formal Observation Results

Measures of observer agreement, using Scott's coefficient, were computed for each of the eight observers across eight teaching episodes. The investigator's ratings of the eight teaching episodes were used as the criterion measure for observer agreement. A reliability coefficient \( \geq .80 \) was established as the criteria to determine the accepted measure of observer agreement.

Table 8 presents the reliability coefficients calculated for each observer for the eight teaching episodes. The first row contains the same identification letters used to identify the observers during the training sessions. The top column of numerals 1-8 identifies the eight teaching episodes used to measure observer agreement.

**TABLE 8**

**CRITERION RELATED RELIABILITY COEFFICIENTS CALCULATED FOR EIGHT OBSERVERS RATING EIGHT TEACHING EPISODES**

<table>
<thead>
<tr>
<th>Observers</th>
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The obtained indices for the eight videotaped teaching episodes as given by Scott's coefficient ranged from .77 to .93. Fifty-nine of the sixty-four reliability coefficients met the criteria of greater than or equal to .80. Only five of the sixty-four coefficients were scored below .80. The agreement scores that did not meet the established criteria (.79, .79, .79, .77, .78) were still relatively high scores. An examination of Table 8 indicates that these five scores were obtained by four different observers during the first three teaching episodes. This information might be interpreted to mean that the observers initially required more practice using the observation instrument. The last four teaching episodes rated by the observers all received coefficient scores greater than or equal to .80. This might indicate that the more experience the observers gained in using the observation instrument the more reliable they became in recording the teaching behaviors.

The ratings of the eight teaching episodes by the investigator and the eight trained observers are presented in Tables 9-17. Each table contains the criterion and observer identification letters A, B, C, E, F, G, H, J on the vertical axis. The Classification numbers from one to twenty-six on the horizontal axis identifies the reflective teaching behaviors contained in the instrument. The tables present the frequency recordings of reflective teaching behaviors identified by the investigator and eight observers in each of the eight teaching episodes.
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CHAPTER V

SUMMARY AND CONCLUSIONS

A summary, conclusions, and recommendations for future use of the observation instrument are presented in this chapter.

Summary

The primary objectives of the study were: (a) to determine what low-inference teaching behaviors are deemed valid important characteristics of reflective teaching; and (b) to determine whether a valid observation instrument can be developed with which observers can identify low-inference reflective teaching behaviors reliably in videotaped teaching episodes.

To accomplish the first objective theoretical works dealing with reflective teaching were reviewed for concepts and behavioral statements consistently used by authors to describe reflective teaching. The concepts and behavioral statements identified from this review were defined operationally and translated into observable low-inference teaching behaviors. Thirty-one reflective teaching behavioral items were identified. Each item was classified according to its particular function in the reflective teaching method.

The reflective teaching process area included teaching behaviors that would help guide students to identify a problem, develop
hypotheses, test hypotheses, develop conclusions, and apply conclusions to new data. The reflective classroom climate area included teaching behaviors that helped facilitate an open discussion, establish and maintain rapport with students, and demonstrate empathy and acceptance with students' ideas, opinions, and beliefs.

Once the thirty-one behavioral items were properly classified, they were incorporated into a first draft of an observation instrument. This instrument was used to accomplish the second objective of the study, which was to determine if the behavioral items contained in the instrument were valid reflective teaching behaviors.

The content validity of the behavioral items contained in the instrument was assessed by a panel of evaluators who were considered knowledgeable about reflective teaching. The selection of panel members was based upon criteria described in detail in Chapter III of this study. The selected evaluators were asked to evaluate the importance of each reflective teaching behavior. A Five-point Likert-type scale was used to identify the importance of each behavior. The scale ranged on a continuum from a numeral -1- indicating Never Important, to a numeral -5- indicating Always Important. The evaluators were asked to circle the numeral which best corresponded with their perception of the importance of each low-inference reflective teaching behavior. Individual scales were presented with each teacher behavioral item (See Appendix A). A mean score was computed and any teaching behavior receiving a
rating of 2.9 or less was considered not important to reflective teaching and deleted from the list. The teaching behaviors that received a rating of 3.0 or more were incorporated into the second draft of the observation instrument. The second draft of the instrument was then pilot-tested to determine if the teaching behaviors could be directly observed in videotaped teaching episodes. The investigator and three other graduate students at The Ohio State University served as observers for this aspect of the study. Five videotaped teaching episodes were observed. In instances where reflective teaching behaviors were not easily identified, or on which consensus could not be reached, the behaviors were discussed and if necessary were edited. Observational procedures that were considered to be ineffective or inefficient were also discussed and when necessary, revised. The modified instrument and the observational procedures that were developed from the pilot-test were used for observer training and for the formal observations of videotaped teaching episodes.

The final objective of the study was to assess the reliability of observers who use the instrument. The purpose of this type of reliability measurement is to determine the accuracy, consistency, and stability of the instrument (Kaplan, 1964).

Ten observers were trained to rate videotaped teaching episodes, using the final form of the observation instrument. Details of the training procedures are described in Chapter III of this study.
Measures of observer agreement were determined by using Scott's coefficient \((\pi)\). Agreement measures were computed for each observer at various points during training. When relatively high observer agreement \((\pi \geq .80)\) was obtained across two consecutive observed teaching episodes, it was accepted as satisfactory evidence of adequate training. Eight of the ten observers met this criteria and were used to formally assess the reliability of the observation instrument. Measures of observer agreement were computed for eight trained observers across eight observed videotaped teaching episodes. Reliability coefficients \(\geq .80\) were used as the criterion to determine the accepted measure of observer agreement. The investigator had previously observed and rated the eight teaching episodes in order to establish a standard that would be used for computing observer agreement. The results of the reliability test are discussed in Chapter IV.

**Conclusions**

This section presents conclusions reached for the two questions investigated in this study.

What Low-Inference Teaching Behaviors are Deemed Important Characteristics of Reflective Teaching?

A panel of eighteen evaluators, who were considered knowledgeable about the theory and practice of reflective teaching, rated twenty-six of thirty-one teaching behaviors as important teaching behaviors for reflective teaching. On the basis of a five-point Likert scale, the
following behaviors received mean scores equal to or greater than 3.0, indicating that these teaching behaviors are considered important for reflective teaching.

Ask divergent questions to identify a problem.

Asks probing questions that identify inconsistencies or contradictions in the beliefs, opinions, or ideas of students.

Asks students to define ambiguous or new terms to help make the problem or question clear and precise.

Asks divergent questions to solicit hypotheses.

Presents data and then asks questions to solicit hypotheses.

Asks probing questions to help students identify and locate sources that could be used to generate hypotheses.

Asks students to suggest possible evidence that may support or refute their hypotheses.

Asks probing questions which lead students to evaluate the validity of the evidence they have collected.

Asks questions that require students to state conclusions concerning the initial problem/question based upon the valid and invalid hypotheses they have tested.

Presents new data and asks students to find evidence that supports or refutes their conclusions.

Directs student-to-student interaction.

Directs the discussion to many students, not just a few.

Allows time (pauses) for students to reflect on the topic being discussed.

Gives examples that relate to what the student is saying.

Listens attentively (without interruptions) while students express their ideas, opinions, questions.

Provides students with corrective feedback in a non-threatening manner.
Makes remarks which indicate that the students' comments are appreciated, accepted and subject to analysis.

Redirects the focus of discussion when student(s) appear to be uncomfortable or self conscious.

Addresses individual students by their names with friendly mannerisms such as smiles, approving nods, pats on the back, etc.

Uses materials to introduce conflicting date.

Asks students to state the problem/question in their own words.

Asks probing questions to help students identify and locate sources that could be used to gence.

Presents data and then asks questions that require students to test their hypotheses.

Talks briefly and then stops so that he does not monopolize the discussion.

Points out what is relevant and not relevant to the discussion.

Makes non-threatening humorous remarks when relevant.

The high validity ratings obtained from the panel of evaluators for the preceding list of reflective teaching behaviors provide warrant for the conclusion that the behavioral items contained in the observation instrument, developed for this study are important characteristics of reflective teaching. On the basis of the validity ratings it is concluded that a teacher who is promoting reflection in a classroom situation would, when appropriate exhibit the teaching behaviors contained in the observation instrument. It is important to reiterate, however, the limitation mentioned in Chapter I. That is, since the focus of this study dealt primarily with reflective teaching behaviors described by theorists in social
studies education, it must be conceded that theorists in other fields might identify additional teaching behaviors that are not included in this study.

Can A Valid Observation Instrument Be Developed With Which Observers Can Identify Low-Inference Reflective Teaching Behaviors Reliably In Videotaped Teaching Episodes?

The observation instrument was used reliably by eight trained observers to identify reflective teaching behaviors in eight videotaped teaching episodes. Observer agreement scores were consistently greater than or equal to the established criterion of .80. This provides warrant for the conclusion that the observation instrument developed in this study can be used reliably by trained observers to identify reflective teaching behaviors in videotaped teaching episodes.

However, there are at least two instrument limitations that were discovered while assessing the reliability of the observation instrument. The first limitation is in regard to observer training. It was noted that observers who were familiar with the concept of reflective teaching achieved accepted observer agreement scores with minimal training. Observers who were not familiar with reflective teaching required extensive training before they were able to use the instrument reliably. Since instrument reliability depends upon the skill of the people using it, observers who are unfamiliar with reflective teaching will require carefully organized and detailed
observer training sessions. The length of the training sessions will depend upon the observer's previous understanding of the reflective teaching concept.

Lambert (1976) discussed the aforementioned limitation with regard to his study. He noted that the lack of knowledge and familiarity of reflective teaching, "... presents tremendous problems for observer training and raises questions about the relationship between knowledge of the process and the degree of reliability of the observer." Lambert used only social studies educators who were familiar with the process of reflective teaching to assess the reliability of his instrument which is one reason why this investigation questioned the reliability measurements obtained in the Lambert study.

A second limitation concerns the sign observation system used to record the occurrence of reflective teaching behaviors in the teaching episodes. This observation format allows the observer to record the frequency of occurrence of certain teaching behaviors. The problem encountered when using this system is directly related to the nature of reflective teaching. The main objective of reflective teaching is to promote reflective thinking among students. A frequency count of behaviors exhibited by the teacher does not provide information as to whether or not the students responded reflectively. For example, the sign observation system might indicate that a teacher asked divergent questions five times to
solicit hypotheses from students. The question remains whether the students responded reflectively and actually offered hypotheses. Thus, the limitation of a sign observation system is that only the amount of reflective teaching can be ascertained, whereas the quality of reflective teaching taking place is not rated. To obtain a complete and accurate rating of reflective teaching an observation system needs to measure both the amount and quality of reflective teaching taking place in the classroom.

The objective in developing the observation instrument for this study dealt only with the identification of low-inference reflective teaching behaviors. This objective was adequately accomplished. However, to correct for this limitation, a Likert scale might be added to each major area contained in the instrument. The Likert-scale would allow observers to rate the quality of reflective teaching that occurs in a classroom. For example, one major area of the observation instrument identifies behaviors used by a teacher to guide students to test hypotheses. A five-point Likert scale added to this area would allow the observer using the instrument to rate the quality of hypotheses testing from Very Adequate...to Very Inadequate. This type of Likert scale added to each major area contained in the instrument would provide a means to measure the quality of reflective teaching that is actually taking place in the classroom or teaching episode.

The frequency of occurrence of certain reflective teaching
behaviors varied throughout the eight teaching episodes. Some behaviors were observed to occur more frequently than others. These variations in frequency are not unexpected due to the nature of the reflective teaching process. For example, behaviors that serve to guide students to identify a problem most likely occur during the initial stage of a lesson. On the other hand, behaviors used to facilitate an open discussion occur more frequently throughout a whole lesson. Based upon the above conclusion, the frequency variations of reflective teaching behaviors in the eight teaching episodes are related to the specific stage of the reflective teaching process that the episode was presenting.

A clarification of this premise is illustrated in Tables 9-16 presented in Chapter IV. Tables 9 and 11 indicate that in teaching episode number one divergent questions were asked to guide students to identify a problem and to solicit hypotheses. The teacher directed student-to-student interaction, directed the discussion to many students not just a few, listened attentively, and made remarks to students, indicating that their comments were appreciated and accepted. In teaching episode number three there are few behaviors identified which indicate that the teacher attempted to identify a problem or solicit hypotheses. Rather, the data indicate that most of the teacher's behaviors involved having students test their hypotheses. The teacher, in episode three, asked students to identify evidence to support or refute their hypotheses, helped
students to identify and locate sources presented data that required students to test their hypotheses.

A comparison of the teaching behaviors identified in teaching episode number one with teaching behaviors identified in episode number three supports the notion that some variance in the frequency recordings of teaching behaviors was related to the specific stage of the reflective teaching process that the episode was presenting.

Recommendations for Future Research and Use of the Observation Instrument

The following questions are recommended to guide future research and use of the observation instrument developed from this study:

1. To what extent can the observation instrument be used reliably to identify reflective teaching behaviors in live classroom situations?

2. To what extent can the observation instrument be used by pre-service and in-service teachers to understand and implement reflective teaching?

3. To what extent can the observation instrument be adopted to assess the amount and quality of reflective teaching taking place in the classroom?

4. To what extent can the observation instrument be adapted into a evaluation tool to determine one's own ability to teach reflectively?

5. To what extent can the observation instrument identify
reflective teaching behaviors across subject matter areas (e.g., the physical sciences vs. humanities)?

6. To what extent does reflective teaching, as operationally defined in this study, affect student achievement and satisfaction in a teaching-learning situation?
APPENDIX A

The Reflective Teaching Survey

Questionnaire Sent To Judges
REFLECTIVE TEACHING OBSERVATION INSTRUMENT
OPERATIONAL DEFINITIONS FOR BEHAVIORAL ITEMS
SURVEY QUESTIONNAIRE

DIRECTIONS:

This survey instrument is designed to determine low-inference teaching behaviors that are deemed important for reflective teaching. The instrument has two main sections--THE REFLECTIVE TEACHING PROCESS and CLASSROOM CLIMATE. The REFLECTIVE TEACHING PROCESS section of the instrument identifies five areas: Identifying a Problem, Developing Hypotheses, Testing Hypotheses, Developing Conclusions, and Applying Conclusions to New Data. THE CLASSROOM CLIMATE section contains three areas: Facilitating an Open Discussion, Empathy and Acceptance, and Establishing and Maintaining Rapport. Several low-inference teaching behaviors are identified within each area. Operational definitions serve to further clarify and explain the teaching behaviors. Using the Likert-type scale provided, circle the number which best corresponds to your perception of the importance of each low inference teaching behavior. Space is provided for comments or suggestions you might have regarding the clarity and/or importance of each teaching behavior and its operational definition. At the end of the survey, more space is provided so that you may list any additional teaching behaviors that are important to reflective teaching but are not included on this instrument.

REFLECTIVE TEACHING PROCESS

IDENTIFYING A PROBLEM

1. Asks divergent questions to identify a problem.

The teacher asks questions that confront students with problem situations. Divergent questions allow for a variety of answers. The teacher does not seek a single "right" answer, only plausible and sometimes best responses. The teacher may ask, for example, 'How might the U.S. improve her relations with the Soviet Union?' 'What would you predict would happen in Central America if Congress denies military aid to Nicaragua?' 'What effect will the dispute between Iran and Iraq have on the U.S. economy?'

This behavior may be initiated by the teacher or it may occur in response to a student's stated belief, opinion, idea, or question.
2. The teacher uses newspapers, books, magazines, pictures, recordings, artifacts or other means that guide students to identify or discover a problem. For example, the teacher may read aloud two conflicting editorials on the subject of the new drunk driving laws. The teacher may show pictures that illustrate impoverished and wealthy lifestyles within the same city.

The teacher initiates this behavior to elicit questions and comments from the students concerning the conflict in data. Students' questions and comments serve to provide a focus on a specific problem or several problems.

3. Asks probing questions that identify inconsistencies or contradictions in the beliefs, opinions, or ideas of students.

The teacher, after listening to a student(s) express a belief, asks a question focusing on other beliefs that may be inconsistent with or contradicts the first belief. For example, the teacher may hear students concur that "Any form of censorship is unconstitutional and it is the government's responsibility to protect our freedom of speech." The teacher then asks the students, "Do you feel it is all right to spend tax dollars to provide police protection for the American Nazi Party to hold a rally in Skokie, Illinois?" Students who disagree with tax monies spent in this manner, or who don't feel that Nazis should be allowed in America, are forced to reevaluate the first belief. Thus, a problem is identified for investigation.

The teacher may directly solicit beliefs, opinions, or ideas about a specific topic, and then initiate this behavior, or it may occur in response to a student(s) comment.
4. **Asks students to state the problem/question in their own words.**

   The teacher, after initiating a problematic situation, asks probing questions to help students narrow the focus of the investigation. For example, the teacher might ask, "What do you see as a problem?" "Why do you feel this is a problem?" "Can you phrase this problem into a question?" "What are some specific questions that you think need to be answered in order to solve this problem?"

   The teacher may initiate this behavior or it may occur in response to a student's question or comment or some non-verbal cue from students indicating doubt, perplexity, or confusion.

5. **Asks students to define ambiguous or new terms to help make the problem or question clear and precise.**

   The teacher asks questions about specific terms that may need to be defined and clarified so that the problem or question is clearly understood by all students. For example, if the problem/question to be investigated was, "What effects has technology had on American lifestyles?", the meanings of "technology" and "lifestyles" may need to be precisely defined in context of the investigation. The teacher could ask, "What kind of technology are we talking about?" "What do you mean by lifestyles?" "Are you referring to our present lifestyles, or those in the future or past?"

   The teacher may initiate this behavior or it may occur in response to a student's question or comment concerning the problem/question.

6. **Present students with a hypothesis to test.**

   The teacher foregoes having students identify a problem and instead gives them a predetermined hypothesis that they can test against evidence. For example, the teacher might read a quote from a book, newspaper, or magazine and ask students to support or refute with evidence.

7. **Asks divergent questions to solicit hypotheses.**

   The teacher asks questions that require students to offer an opinion or guess about possible solutions to a problem/question.
Students responses are usually based on past learning or personal experiences. For example, the teacher may ask, "What are some possible causes of the Viet Nam War?" "What affect might the present cold war have on world peace?" "What foreign policy could we expect from Jesse Jackson?"

The teacher may initiate this behavior or it may occur in response to a student's question or comment.

8. Presents data and then asks questions to solicit hypotheses.

The teacher presents newspapers, books, magazines, pictures, recordings, word lists, diaries or other data sources that can be used to generate hypotheses. The teacher then asks questions that require students to make inferences, predictions, classifications, or state relationships. This may be done on an individual basis or in small or large group sessions.

The questions asked by the teacher may be phrased in the following manner: "What do these pictures indicate about life in China?" "Based on these newspaper articles who do you think will win the Democratic nomination?" "What time period is this music and art work from?" "Why did Benjamin Franklin write this comment in his diary?"

The teacher initiates this behavior to elicit hypotheses from the students concerning the problem/question. Student's hypotheses serve to provide a focus for gathering evidence.

9. Asks probing questions to help students identify and locate sources that could be used to generate hypotheses.

The teacher, after having students identify and clarify a problem/question, asks students questions that will guide them to sources that relate to the problem/question. For example, a teacher may ask, "Where could we find more information about the American Indian?" "How could the Museum of History help us find out more about American Indians?" "Can you think of other sources or places that would provide us with information?" "What kind of information do we need to find in order to answer our problem/questions?"

10. Provides time for students to gather sources and formulate hypotheses.

The teacher, once students have identified reasonable and accessible sources, encourages students to locate these sources their hypotheses were false. For example, the teacher may ask,
and investigate them for hypotheses related to the problem/ question. For example, the teacher may allow students to gather information in a library, or browse through materials that are already provided in the classroom.

TESTING HYPOTHESES

11. Asks students to suggest possible evidence that may support or refute their hypotheses.

The teacher, once students have formulated clearly defined hypotheses, asks students to determine what kind of evidence they would expect to exist if their hypotheses were true and if their hypotheses were false. For example, the teacher may ask, "What evidence would you need to find that will help prove the hypothesis that most early American Indians were farmers?" "What evidence would suggest that most early American Indians were not farmers?"

The teacher may initiate this behavior through a question/answer discussion, or it may be initiated as a writing assignment for individuals or small groups.

12. Asks probing questions to help students identify and locate sources that could be used to generate evidence.

The teacher, after having students identify supportive and non-supportive evidence, will ask students questions that will guide them to sources that relates to the evidence they are looking for. For example, a teacher may ask, "Where could we find evidence about the occupations held by early American Indians?" "What kind of books might we refer to?" "Can you think of other sources or places that might tell us about early American Indian occupations?"

This behavior may be initiated by the teacher or it may occur in response to a student question or comment.

13. Provides time for students to locate sources and gather evidence.

The teacher, once students have identified reasonable and accessible sources, allows students to locate these sources and investigate them for evidence related to the hypotheses being tested. For example, the teacher may allow students to conduct a survey, interview people, gather information in a library, or use materials that are already provided in the classroom.
14. Presents data and then asks questions that require students to test their hypotheses.

The teacher presents data sources that can be used to generate evidence which supports and/or refutes the hypotheses. The teacher then asks questions that require students to identify supportive and non-supportive evidence, evaluate the validity of the evidence and its source, and state relationships between the evidence and the hypotheses. For example, the teacher may ask, "Read this letter written by Benjamin Franklin. Can you find evidence that supports or refutes our hypothesis about slavery in Colonial America?" "Do you think the information contained in this letter is accurate?" "How can we be sure?" "Based on the evidence you’ve cited so far, what can you tell me about the accuracy of our hypothesis?"

The teacher initiates this behavior to have students identify and evaluate potential evidence that can be used to support or refute hypotheses. The evidence serves to provide a basis for developing conclusions.

15. Asks probing questions which lead students to evaluate the validity of the evidence they have collected.

The teacher, once students have collected evidence to support or refute their hypotheses, may ask students to prove that the evidence collected is factual, not just opinions, biases, or assumptions. For example, the teacher may ask, "What other sources have you found that support this evidence?" "Have you compared and contrasted this evidence with other sources?" "What did you find out?" "Is this evidence current?" "Who wrote it?" "When was it written and why?" "Is your evidence consistent?"

The teacher may initiate this behavior through a question/answer large group discussion, or it may occur as the teacher works with individuals or small groups.

16. Asks questions that require students to relate the evidence to the hypotheses being tested.

The teacher will ask students how the evidence they have collected either supports or refutes the hypotheses being tested. For example, the teacher may ask, "What evidence did you find that provides support for the hypothesis that early American Indians were farmers?" "Why do you think that this evidence actually proves that they were farmers?" "What evidence did you find that might refute our hypotheses?"
The teacher may initiate this behavior through a question/answer discussion, or it may be initiated as a writing assignment for individuals or small groups.

17. Asks questions that require students to state conclusions concerning the initial problem/question based upon the valid and invalid hypotheses they have tested.

The teacher, after students have tested their hypotheses, will ask divergent and evaluative questions to guide students in developing conclusions. For example, the teacher may ask, "Which hypotheses provided an accurate description about the negative effects technology has had on American lifestyles?" "What evidence do you have that supports this conclusion?" "Which hypotheses did not provide an accurate description?" "What evidence do you have that supports this conclusion?" "What can we definitely state about the effects technology has had on American lifestyles?"

The teacher initiates this behavior to elicit conclusions for the students concerning the initial problem/question. Students accepted or refuted hypotheses serve to provide an information base for developing these conclusions. The teacher may initiate this behavior through a large or small group question/answer discussion, or it may be initiated as a writing assignment.

18. Presents new data and asks students to find evidence that supports or refutes their conclusions.

The teacher introduces new data that is relevant to the initial problem/question but has not been used by students to develop their conclusions. The teacher will ask the students how the new data either supports or refutes their conclusions. For example, the teacher may introduce two medical journals that ask, "What evidence can you find that provides support for the conclusion that advanced technology has increased our life expectancy?"

The teacher initiates this behavior to elicit further evidence which may support or refute the students conclusions. The teacher may initiate this behavior through a large or small group question/answer discussion, or it may be initiated as a writing assignment.
FACILITATES AN OPEN DISCUSSION

1. Arranges chairs in seminar or small group style.

   The teacher asks students to arrange their chairs in a circle or semicircle so that communication between students and the teacher will be face-to-face. Or, the teacher may have already arranged the chairs in a circle or semi-circle.

2. Directs student-to-student interaction.

   The teacher asks students to comment on each other's opinions and ideas. For example, the teacher may say, "John said that Abraham Lincoln used the issue of slavery merely to further his political career. He, in John's opinion, was a political opportunist. How do the rest of you feel about this statement?"

   The teacher initiates this behavior in response to a student's comment.

3. Directs the discussion to many students, not just a few.

   The teacher asks questions and solicits opinions from a wide variety of students to ensure that a few students do not monopolize the discussion.

   The teacher may initiate this behavior by randomly calling on students or it may occur in response to non-verbal cues from students indicating that they want to participate.

4. Talks briefly and then stops so that h/she does not monopolize the discussion.

   The teacher makes most explanations, reviews, and responses to students questions or comments brief and to the point. He deliberately pauses and provides time for students to respond and/or ask questions.

   The teacher may directly solicit comments and/or questions from students, or may pause for a while and give some non-verbal cue to students indicating they are invited to begin discussion.
5. **Allows time (pauses) for students to reflect on the topic being discussed.**

The teacher deliberately pauses after important comments or questions to allow students time to think. The teacher may say to students "Let's stop and think about this for awhile." or "This requires serious consideration, let's think before we make any hasty judgments."

The teacher may initiate this behavior after introducing some aspect of content, or it may occur in response to a student's question or comment.

6. **Points out what is relevant and not relevant to the discussion.**

The teacher deliberately draws students' attention to those aspects of the discussion that are important and relevant, and courteously draws attention away from irrelevant discussion. The teacher may say, for example, "That is a very important observation, let's pursue it further." In the case of an irrelevant comment, "That is an interesting comment but let's re-direct our attention to the main topic."

The teacher initiates this behavior in response to a student's question or comment.

**EMPATHY AND ACCEPTANCE**

7. **Gives examples that relate to what the student is saying.**

The teacher describes or explains a similar instance related to what a student has just described or explained. The teacher may say, for example, 'A similar situation might be...'; 'This reminds me of ...'; 'Would this example be an accurate illustration of what you are saying...'; etc.

This behavior is initiated in response to a student's comment or question. It serves to clarify students' comments and opinions and provides positive reinforcement that students' comments and opinions are understood and accepted.

8. **Listens attentively (without interruptions) while students express their ideas, opinions, questions.**

The teacher pays close attention to what students are saying and provides non-verbal cues like nodding his head and maintaining eye contact to encourage continuation of expressions.
The teacher initiates this behavior in response to students ideas, opinions, questions.

9. Provides students with corrective feedback in a non-threatening manner.

   The teacher uses data to help students discover that what they are saying may be wrong. Rather than presenting himself as the subject matter authority, the teacher directs students to data sources which contradict what the student is saying. The teacher then asks students to explain the contradiction. This behavior allows students to retain the integrity of changing their own minds and keeps the quest of knowledge in spirit with true reflective thinking.

   The teacher initiates this behavior in response to students ideas, opinions, comments.

10. Makes remarks which indicate that the students' comments are appreciated, accepted and subject to analysis.

   The teacher provides students with positive feedback when they participate in discussions and at the same time facilitates a critique or analysis of their comments. The teacher might say, for example, 'Thanks for that interesting observation.' 'You seem to have done a lot of reading on the subject.' 'Let's examine how your ideas compare with others in this class and the authorities in the field.'

   The teacher initiates this behavior in response to students ideas, opinions, comments.

11. Redirects the focus of discussion when student(s) appear to be uncomfortable or self-conscious.

   The teacher, on observing a student's nervous reaction to a question or comment, provides the student with an option not to answer the question or not offer a comment. The teacher may say, for example, 'Think about it for awhile and I'll get back to you,' or he might ask a general question to the whole class, 'How do the rest of you think about...'

   The teacher initiates this behavior whenever a student gives verbal or non-verbal cues that h/she is becoming very embarrassed or uncomfortable with the discussion.
12. Makes non-threatening humorous remarks when relevant.

The teacher will ease the tension of a discussion or relax students prior to a discussion with some anecdote of humor.

This behavior is initiated to establish a more relaxed climate so that students feel at ease to express themselves and to enhance the student-teacher relationship.

13. Addresses individual students by their names with friendly mannerisms such as smiles, approving nods, pats on the back, etc.

The teacher conveys to the students through verbal and non-verbal behaviors that they are liked and that their participation in class is respected and appreciated.

The teacher initiates this behavior prior or after class during informal conversation or during classroom discussion.
APPENDIX B

Letter Sent To Evaluators
Dear : 

I am presently conducting a dissertation study in the field of social studies education under the guidance of Professor M. Eugene Gilliom, Ohio State University. The purpose of this study is to review the concept of reflective teaching, as defined by social studies educators, and to develop an observation instrument that can be used to judge whether a teacher is implementing these reflective teaching behaviors. The major questions to be investigated are: (a) What low-inference teaching behaviors are deemed important characteristics of reflective teaching? and, (b) Can a valid and reliable observation instrument be developed that can be used to identify the low-inference reflective teaching behaviors in an actual teaching lesson?

I am now at a point in the study where I must assess the content validity of the observation instrument. I plan to do this by having a panel of judges who are considered knowledgeable about reflective teaching evaluate the importance of each reflective teaching behavior included in the instrument. You have been recommended to me as a person who is familiar with the theory and practice of reflective teaching. I would greatly appreciate it if I may solicit your assistance and cooperation in this phase of the study. If you have the time and are willing to participate, will you kindly complete the enclosed survey instrument. I have enclosed a self-addressed stamped envelope so that you may return the completed survey to me as soon as it is convenient.

I shall greatly appreciate any assistance you may give me in completing my study.

Sincerely,

Edward Jadallah

EJ:ma

Enc.
APPENDIX C

The Draft of the Instrument

Used During Pilot Test
REFLECTIVE TEACHING PROCESS

IDENTIFYING A PROBLEM

1. Asks divergent questions which allow students to identify problems or questions concerning the subject matter.

2. Uses materials to introduce conflicting data.

3. Asks probing questions which identify inconsistencies or contradictions in the beliefs, opinions, or ideas of students.

4. Asks students to state the problem or question in their own words.

5. Asks students to define or clarify ambiguous and new terms to help make the problem or question clear and precise.

DEVELOPING HYPOTHESES

6. Asks divergent questions to solicit hypotheses.

7. Presents data and then asks questions to solicit hypotheses.

8. Asks probing questions to help students identify and locate sources that could be used to generate hypotheses.

TESTING HYPOTHESES

9. Asks students to suggest possible evidence that may support or refute their hypotheses.

10. Asks probing questions to help students identify and locate sources that could be used to generate evidence.

11. Presents data and then asks questions that require students to test their hypotheses.

12. Asks probing questions which lead students to evaluate the validity of the evidence they have collected.

DEVELOPING CONCLUSIONS

13. Asks questions that require students to state conclusions concerning the initial problem or question based upon the valid and invalid hypotheses they have tested.
APPLYING CONCLUSIONS TO NEW DATA

14. Presents new data and asks students to identify evidence that supports or refutes their conclusions.

CLASSROOM CLIMATE

FACILITATES AN OPEN DISCUSSION

15. Directs student to student interaction.

16. Directs the discussion to many students not just a few.

17. Talks briefly and then stops so that he does not monopolize the discussion.

18. Allows time (pauses) for students to reflect on the topic being discussed.

19. Points out what is relevant and not relevant to the discussion.

EMPATHY AND ACCEPTANCE

20. Gives examples that relate to what the student is saying.

21. Listens attentively (without interruptions) while students express their ideas, opinions, questions.

22. Provides students with corrective feedback in a non-threatening manner.

23. Makes remarks that indicate that the students' comments are appreciated, accepted, and subject to analysis.

24. Redirects the focus of discussion when student(s) appear to be uncomfortable or self-conscious.

ESTABLISHES AND MAINTAINS RAPPORT

25. Makes non-threatening humorous remarks when relevant.

26. Addresses individual students by their names with friendly mannerisms such as smiles, approving nods, pats on the back, etc.
APPENDIX D

Outline Of The Instrument Used

During Formal Observation

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IDENTIFYING A PROBLEM

1. Asks divergent questions which allow students to identify problems or questions concerning the subject matter.

2. Uses materials to introduce conflicting data.

3. Asks probing questions which identify inconsistencies or contradictions in the beliefs, opinions, or ideas of students.

4. Asks students to state the problem or question in their own words.

5. Asks students to define or clarify ambiguous and new terms to help make the problem or question clear and precise.

DEVELOPING HYPOTHESES

6. Asks divergent questions to solicit hypotheses.

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8. Asks probing questions to help students identify and locate sources that could be used to generate hypotheses.

TESTING HYPOTHESES

9. Asks students to suggest possible evidence that may support or refute their hypotheses.

10. Asks probing questions to help students identify and locate sources that could be used to generate evidence.

11. Presents data and then asks questions that require students to test their hypotheses.

12. Asks probing questions which lead students to evaluate the validity of the evidence they have collected.

DEVELOPING CONCLUSIONS

13. Asks questions that require students to state conclusions concerning the initial problem or question based upon the valid and invalid hypotheses they have tested.
APPLYING CONCLUSIONS TO NEW DATA

14. Presents new data and asks students to identify evidence that supports or refutes their conclusions.

CLASSROOM CLIMATE

FACILITATES AN OPEN DISCUSSION

15. Directs student to student interaction.

16. Directs the discussion to many students not just a few.

17. Talks briefly and then stops so that he does not monopolize the discussion.

18. Allows time (pauses) for students to reflect on the topic being discussed.

19. Points out what is relevant and not relevant to the discussion.

EMPATHY AND ACCEPTANCE

20. Gives examples that relate to what the student is saying.

21. Listens attentively (without interruptions) while students express their ideas, opinions, questions.

22. Provides students with corrective feedback in a non-threatening manner.

23. Makes remarks that indicate that the students' comments are appreciated, accepted, and subject to analysis.

24. Redirects the focus of discussion when student(s) appear to be uncomfortable or self-conscious.

ESTABLISHES AND MAINTAINS RAPPORT

25. Makes non-threatening humorous remarks when relevant.

26. Addresses individual students by their names with friendly mannerisms such as smiles, approving nods, pats on the back, etc.
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