THE EFFECTS OF REFLECTIVE TEACHING AND A SUPPLEMENTAL THEORETICAL COMPONENT ON PRESERVICE TEACHERS' REFLECTIVITY IN ANALYZING CLASSROOM TEACHING SITUATIONS

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of the Ohio State University

By

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CHAPTER I
INTRODUCTION

Throughout the history of teacher education, there have been advocates of the view of teachers as reflective practitioners. As early as 1904, John Dewey argued that it is more important to make teachers thoughtful and alert students of teaching than it is to help them gain immediate technical proficiency.

More recently, writers like Silberman (1970) and Feiman (1979) have advocated a view of teaching as an ongoing process of reflective inquiry. Feiman, for instance, argued that "the teacher is not a technician; nor can the job of teaching be reduced to a set of skills and behaviors. It draws heavily on the teachers' capacity for insight into their own aims and procedures" (p. 78). Silberman concluded that the major reason for teacher failure is a lack of consideration of the aims and purposes of educational activities:

If [teachers] make a botch of it, and an uncomfortably large number do, it is because it simply never occurs to more than a handful of them to ask why they are doing what they are doing -- to think seriously and deeply about the purpose or consequences [of what they do].... We must find ways of stimulating public school teachers ... to think about what they are doing and why they are doing it. (p. 11)
This view of teaching as an ongoing inquiry, a search for situationally effective solutions to basic educational problems, has gained increasing support in teacher education circles in recent years. Various phrases have been used in the literature to capture this special mode of functioning: a reflective or inquiring stance; the capacity for informed and independent judgment; the commitment to study and learn from one's own practice (Feiman, 1979). Philosophical tracts such as Adler's Paedeia Proposal (1982), the various commission reports beginning with that of the National Commission on Excellence in Education, and numerous journal articles have supported this image of teaching. The report of the Holmes Group (1986) advocates a vision of teachers as competent professionals that "exemplify the critical thinking they strive to develop in students, combining tough-minded instruction with a penchant for inquiry" (p. 28). Such conceptions of teachers and teaching have received extensive exposure in the teacher education literature during recent years and have led to a rapidly growing interest in, and support for, teacher reflection.

The justification for such an emphasis comes from the limitations of preservice teacher preparation, the state of our knowledge about teaching, and the job of teaching itself (Feiman, 1979). Preservice teacher education cannot prepare prospective teachers for every situation they may encounter, nor can it equip them with all of the knowledge and skills
they will need for an entire career. No teacher education program, no matter what orientation or how good, can produce a fully developed teacher at the preservice level (Zeichner, 1981-82). Additionally, teaching is an activity that occurs in a complex, uncertain environment within which there are no absolutes, no right answers guaranteed to work every time. Rather, teaching is an activity in which professional judgment and decision making must be exercised in order to guide the provision of appropriate instruction (Borko & Shavelson, 1983). Finally, if children are to be encouraged and trained to think deeply, critically, and reflectively, then their teachers must themselves know how to think deeply and to teach with critical reflection (Cruickshank, 1986a).

Given these arguments and accepting them, it follows that teacher education cannot simply transmit knowledge and solutions that others have devised. The most fundamental task is to develop in prospective teachers the capacity to reflect on and learn from teaching practice.

Despite the fundamental nature of this goal, teacher education programs have been beset with numerous problems in their efforts to develop reflective, thoughtful, critical teachers. One of the problems noted by several writers is the historically dominant apprenticeship view of student teaching and other field experiences. In the apprenticeship perspective, firsthand experience is viewed as the process by which students come to terms with the real world.
Students are encouraged, consciously and unconsciously, to model their cooperating teachers, and consequently, reflective inquiry becomes much less important than performance that meets the expectations of the field placement. In addition, the structure of the school day, the use of pre-determined curriculum materials and the typical school emphasis on order and control frequently limit the ability of students to experiment with new ideas and methods or to reflect about the consequences of their actions (Ross, 1987). For the most part, then, field experiences in teacher education fail to enhance students' reflectivity, contributing instead to their passivity as they learn how to fit into already-established patterns of traditional school practice (Goodman, 1986; Innocone, 1963; Tabachnik, 1980; Zeichner, 1981-81).

The incoming attitudes of students are also cited by teacher educators as a problem in the development of reflectivity in students (Korthagen, 1985; Ross, 1987; Zeichner & Liston, 1987). Many initial attitudes and expectations must be unlearned before students can begin to be reflective (Ross, 1987). For example, many students enter teacher education expecting teacher educators to "tell them the answers" rather than viewing teaching as an ongoing inquiry (Korthagen, 1985). This expectation, coupled with their years of experience as passive students, makes it
difficult for students to view inquiry and reflection as essential aspects of learning to teach.

The nature of the university instruction received by preservice teachers has also been cited as an impediment to reflective thought. According to Ferguson (1986), the vast majority of college students are the products of instruction that has typically emphasized assimilating facts, following orders, and pleasing others. Teacher educators, however, cannot expect students to see the value of reflection if their pedagogy forces students into conventional, passive roles (Zeichner, 1981-82), or if they discourage reflection by reinforcing students' ideas that the most important part of student teaching is to fit in, get along, and get good recommendations (Tabachnik, Popkewitz, & Zeichner, 1979-80). If prospective teachers are to become reflective, critical thinkers, then the role of instruction in teacher education should be the role of empowering preservice teachers to teach reflectively by providing an environment that exemplifies inquiry instruction and classroom interaction (Ross & Hannay, 1986).

Because of the importance of preparing reflective teachers and because of the apparent inability of traditional teacher education programs to do so, several teacher educators have designed programs and/or specific instructional strategies which have as their central aim the development of teachers who have the skills and dispositions
to continually inquire into and reflect on their own teaching practices. One such strategy is Reflective Teaching, conceptualized and developed at The Ohio State University by Donald R. Cruickshank and associates (1980). Reflective Teaching is a peer teaching exercise designed to provide students the opportunity to learn about teaching by teaching and by giving immediate and thoughtful consideration to that teaching. Reflective Teaching is a means to an end, the end being to engage preservice teachers in thoughtful, analytical consideration of a teaching act just experienced. By participating in these activities, it is hoped that preservice teachers will become more thoughtful and alert students of education who can see complex relationships among their personal characteristics and training, their learners' characteristics, the learning environment, the content to be taught and their teaching behaviors (Cruickshank, 1987).

As originally designed, Reflective Teaching does not provide preservice teachers with conceptual or theoretical knowledge about reflective thinking. While Reflective Teaching includes practice in reflection, it provides no conceptual knowledge or theory about reflection. A review of the literature, however, indicates that it may prove beneficial to also include a theoretical or conceptual component in teacher training regimens such as Reflective Teaching.
In a review of the literature on training in teacher education, for example, Cruickshank and Metcalf (in press) found that many training regimens emphasize the importance of first introducing the skill conceptually or theoretically in order to ensure an awareness of the skill, its importance, how it can be used, and how it fits into the trainee's repertoire. Tillema and Veenman (1987) and Joyce and Showers (1981, 1983) support the following type of training regimen:

1. Presentation of theory
2. Modeling or demonstration
3. Practice in simulated or natural classroom settings
4. Structured and open-ended feedback
5. Coaching for application

More recently, Joyce and Showers (1988) suggest that training regimens include an explanation of theory as well as opportunities for practice. Cruickshank and Metcalf (in press) reported that results of research conducted by Gliessman and Pugh (1984, 1987), Harding (1965), Hudgins (1974), and Kieras and Bovair (1986) all supported the importance of ensuring basic conceptual understanding of the skill to be learned and when and why it is to be used. Based on a review of the literature on training, then, it would seem that the Reflective Teaching regimen could be improved by adding a conceptual or theoretical component.
focusing on what is known about the processes and outcomes of reflective thinking, its importance in learning and growth, and strategies for enhancing one's reflective capabilities.

The literature on reflective thinking also supports this notion. Boud, Keogh, and Walker (1985) posit that it is useful for learners and teachers to have a model of reflection which points to some of the major processes which they should consider, for them to have their attention drawn to the importance of reflective activity, and for them to plan consciously for the reflective stage of the learning process. According to Boud et al., reflection at the unconscious level can and does occur, but these unconscious processes do not allow one to make active and aware decisions about learning. It is only when ideas are brought to the conscious level that they can be evaluated and informed decisions can be made. For these reasons it is important for the learner to be aware of the role of reflection in learning, and how the processes involved can be facilitated.

Boyd and Fales (1983) found that once individuals became more aware of their spontaneous reflective activity and its importance to them, they were able to use it intentionally in their own learning, change, and growth. Based on their research, Boyd and Fales concluded that:
...the mere naming of the process -- the bringing to consciousness what is done naturally -- is a significant aid to the use of reflective learning.... Techniques of reflective thinking can be intentionally taught, thereby facilitating the development and more effective use of this mental skill. Naming and valuing the process are the first steps. (p. 113)

The literature on reflective thinking, then, also supports the notion that it may be beneficial to include a theoretical or conceptual component in the Reflective Teaching regimen.

**Problem Statement**

The previous discussion leads to two problems or questions in need of inquiry: (1) Does Reflective Teaching enhance preservice teachers' ability to reflect on the teaching/learning processes occurring in classroom teaching situations? (2) Does supplementing the Reflective Teaching regimen with a conceptual/theoretical component enhance participants' reflectivity to a greater extent than does Reflective Teaching as originally designed?

**Need for the Study**

In view of the growing consensus that preparing teachers for self-directed growth through reflective inquiry is an essential goal for teacher education programs, it follows that teacher educators should have empirical
knowledge of the effects of various strategies designed to realize that goal.

At present very little research exists on the outcomes of Reflective Teaching and other strategies designed to enhance teachers' reflectivity. After reviewing the limited research available, Zeichner (1987) concluded that "much more research needs to be initiated which systematically addresses the impact of specific approaches" to developing reflective teachers (p. 573). According to Zeichner, this area of inquiry needs to move beyond the self-reports and isolated examples of success that are currently available.

Cruickshank (1987) also calls for more research in this area; specifically, more research on Reflective Teaching. According to Cruickshank, numerous unanswered questions about Reflective Teaching remain, including this basic question: "What indeed are the beneficial outcomes of being provided with an opportunity to teach and then to reflect on the teaching?" (p. 62). Two kinds of studies are needed, in Cruickshank's view: (1) research that would assume in advance that certain benefits accrue from participation in Reflective Teaching, and (2) research that would describe and analyze the behavior of participants during Reflective Teaching to gain insights into the outcomes and benefits.

Such research would provide an empirical basis for evaluating the claims of Reflective Teaching's developers as well as the criticisms of its detractors. Gore (1987), for
example, has criticized Reflective Teaching, both for its lack of empirical support and because "features of the Reflective Teaching approach appear to hinder the achievement of its own aims, that is, the development of teachers who are reflective" (p. 35).

The results of this study provide an empirical basis for partially resolving the current debate concerning the benefits of Reflective Teaching. In addition, it provides information concerning the benefits of adding a theoretical component to the Reflective Teaching regimen. The results of this study should prove useful to teacher educators interested in preparing reflective teachers. While additional research on these and other strategies to increase preservice teachers' reflectivity is certainly needed, this study provides a partial basis for instructional decision-making in teacher education programs.

**Hypotheses**

The following research hypotheses were posed at the outset of the study:

1. **Students who participate in Reflective Teaching will exhibit a greater degree of reflectivity in their analysis of classroom situations than will students who have not participated in Reflective Teaching.**

2. **Students who participate in augmented Reflective Teaching will exhibit a greater degree of reflectivity in their analysis of classroom situations.**
situations than will students who participate in the original Reflective Teaching regimen.

3. Subjects who participate in Reflective Teaching or augmented Reflective Teaching will exhibit a greater difference between their pretest and posttest scores than will subjects who participate in neither Reflective Teaching nor the theoretical component on reflective thinking.

4. Students who participate in augmented Reflective Teaching will score higher on the posttest of theoretical knowledge than will students in the control group or the Reflective Teaching group.

5. There will be a positive correlation between students' theoretical knowledge about reflective thinking and their degree of reflectivity in analyzing classroom teaching situations.

Definitions

For the purpose of this investigation, the following definitions will be used:

**Reflective thinking**: Active, persistent, and careful consideration of knowledge, beliefs, values, and experiences in light of the grounds which support them and in light of their consequences.

**Reflective Teaching**: A peer teaching exercise developed by Cruickshank and associates (1980) at The Ohio State University for the purpose of providing preservice teachers with the opportunity to participate in the complete act of teaching (planning, instruction, and evaluation) and to reflect upon the teaching/learning processes that occurred.
Augmented Reflective Teaching: The original Reflective Teaching regimen plus a one and one-half hour in-class session focusing on theoretical knowledge about reflective thinking, including: (1) a lecture on the cognitive processes involved in reflection, the benefits, uses, and outcomes of reflective thinking, the reasons why teachers should be reflective about their work, and Van Manen's (1977) levels of reflection in analyzing classroom situations; (2) a discussion of the role of reflection in the students' own lives; (3) a demonstration by the instructor modeling the process of reflecting on a given classroom situation; and (4) student practice in reflecting on classroom situations drawn from their own educational backgrounds (see Appendix E).

Degree of reflectivity: The amount or degree of reflectivity as indicated by a rating of the Reflective Teaching Index developed by Zeichner and Liston (1985).

Reflective Teaching Index: A rating system developed by Zeichner and Liston (1985), based upon the work of Van Manen (1977) and Gauthier (1963), to assess the quality of discourse by categorizing thought units into four types of practical discourse: factual discourse, prudential discourse, justificatory discourse, and critical discourse. Each of these categories is further divided into several subcategories (see Appendix L).
Assumptions and Limitations

For the purposes of this investigation, the following assumptions were accepted:

1. Helping preservice teachers become more reflective about classroom practices is an appropriate and desirable goal for teacher education programs.

2. Teacher educators can help preservice teachers to become more reflective, thoughtful, and analytical in assessing classroom teaching situations.

3. The instrument used in the study presented the researcher with valid and reliable data. Specifically, the Reflective Teaching Index (Zeichner & Liston, 1985) offers an adequate measure of students' degree of reflectivity in analyzing classroom situations.

4. The videotaped classroom teaching episodes served as an adequate stimulus for provoking reflective thought among preservice teachers.
For the purposes of this investigation, the following limitations should be considered:

1. Treatment groups consisted of intact sections of students in an introductory education course, with no random assignment of subjects to treatments.

2. Due to competing course demands, only limited time was available for administering treatment conditions.

3. The posttest assessed only preservice teachers' reflectivity in analyzing classroom situations. It did not assess their ability or propensity to reflect on personal teaching experiences, values, or beliefs.
CHAPTER II
REVIEW OF RELATED LITERATURE

The notion of reflection in learning is not a new one. Some writers have traced reflection as far back as Aristotle's discussions of practical judgment and moral action (Grundy, 1982). Probably the most influential figure in modern times has been John Dewey, whose writings on reflective thinking in the early part of this century continue to influence contemporary educators. In recent years teacher educators have become interested in applying what is known about reflective thinking to teacher education programs in order to prepare teachers who are more thoughtful, reflective, and analytical in their classroom practice.

This review of the literature is divided into three parts. The first section presents basic theoretical knowledge about reflective thinking, including a discussion of the cognitive processes involved in reflection, models of the role of reflection in the learning process, and attitudes necessary for reflective thinking. The second part of the chapter focuses on the preparation of reflective teachers, the rationale for such an approach, related problems, and instructional strategies designed to enhance
prospective teachers' propensity and ability to engage in reflective thinking. The third and final section focuses on Reflective Teaching, a teacher training regimen developed at The Ohio State University to enhance teaching through introspection, reflection, and analysis of the teaching/learning process.

What is Reflective Thinking?

It may be helpful at the outset to clarify the terminology encountered in theoretical discussions of reflective thinking. The terms "reflective thinking," "reflection," and "reflectivity" seem to be used interchangeably in the literature to refer to the process of internally examining and exploring an issue of concern in order to lead to new insights and understandings. In keeping with their use in the literature, "reflection," "reflective thinking," "reflective thought," and "reflectivity" will be used interchangeably in this literature review to refer to an internal examination, introspection, or consideration of an issue of concern. The terms "reflective learning" and "experiential learning" are used by theorists such as Kolb (1981) and Boyd and Fales (1983) to refer to a cycle of learning with reflection as a key element within the learning process. "Reflective activity" and "reflective experience" are terms used by John
Dewey (1916) to describe a coherent problem-solving process, in contrast to haphazard trial-and-error activity. Teacher educators use the term "reflective teaching" as a generic term referring to a range of efforts designed to prepare teachers who are more thoughtful. When capitalized, "Reflective Teaching" is used in reference to a specific teacher education regimen developed at The Ohio State University (Cruickshank, et al., 1980) to prepare students to reflect on teaching in order to become thoughtful and wise teachers. Each of these terms will be discussed in greater depth in subsequent sections of this literature review, beginning in the next section with a look at general definitions and descriptions of reflective thinking.

**Definitions and Descriptions of Reflective Thinking**

Many contemporary theorists base their definitions of reflection on Dewey's (1933) description of reflective thought as 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" (p. 9). According to Dewey, reflection "emancipates us from merely impulsive and merely routine activity.... [and] enables us to direct our actions with foresight and to plan according to ends-in-view, or purposes of which we are aware" (p. 17).
More recent definitions of reflection echo Dewey's emphasis on active assessment of one's beliefs, values, and actions. Valverde (1982), for example, describes reflection thusly:

Reflection means asking basic questions of oneself. The basic and comprehensive question during reflection is, "What am I doing and why?" Reflection is a form of slightly distorted self-evaluation -- distorted in the sense that judgment is emphasized rather than data collection. The individual asks value-laden questions and responds on stored, selected data (memory), and then concludes whether he or she is satisfied or dissatisfied. Reflection, then, is an individual's needs assessment and continued self-monitoring or satisfaction with effectiveness. (p. 86)

Similarly, Cruickshank (1986b) comments that reflection occurs "when something is brought to mind or consciousness so that consideration can be given to it" (p. 85).

If, as described above, reflection is an active examination of personal experiences, beliefs or values, then it must be an intentional, purposeful process. Reflective thinking is not idle meandering or daydreaming, but purposive activity directed towards a goal (Boud, Keogh, & Walker, 1985). It aims at a conclusion and has a purpose beyond that of random recollections and flitting impressions (Dewey, 1933). Depending on one's intentions or purposes, reflective thinking can be directed towards exploring organized knowledge, self-exploration, or examining the natural and human environment. One's intentions or purposes permeate every stage of the process from the choice to
engage in reflection to the ultimate results of the reflective process (Boud, Keogh, & Walker, 1985).

Reflective thinking, then, is an active, purposeful assessment of one’s beliefs, experiences, and knowledge in light of the grounds which support them and in light of their consequences. This process of active, reflective thinking is a key element in gaining new meanings or insights from experience. Boud, Keogh, and Walker (1985) describe reflection as "those intellectual and affective activities in which individuals engage to explore their experiences in order to lead to new understandings and appreciations" (p. 19). Shapiro (1985) offers a similar emphasis on the gaining of new meanings through reflection on experience:

Reflection is a mode in which there is at once an awareness of that which has been abstracted and of the self implied in that abstraction. It is a holding of a lived moment at arm’s length in a way that allows the meaning itself to be posited, particularly that meaning that illuminates the self which co-constituted a given situation or phenomenon. (p. 13)

This process of constructing new meanings through reflection may take place in isolation or in association with others. May (1986) defines reflectivity as "a form of consciousness-raising at both the individual and collective levels...raising critical questions and instigating discussions related to values and the context(s) in which values shape decisions and action" (p. 11). Grundy (1982)
emphasizes the value of groups of learners reflecting together on shared experiences, each person bringing to bear his or her informed practical judgments relevant to the event. This shared researching and evaluating of ideas results in new knowledge and insights which may then be applied to other relevant events.

While reflection may be stimulated by group discussions and questions as described above, it remains an inherently individual process. Reflection is an internal examination of issues of concern and emphasizes the self as the source of learning (Boyd & Fales, 1983). Others can intervene in various ways to assist, but they only have access to the individual's thoughts and feelings through what the individual chooses to reveal about himself (Boud, Keogh, & Walker, 1985). Research has shown that each individual reflects differently; different strategies are used, different experiences are salient as "triggers" for reflection for different individuals, and different individuals are more or less conscious of their reflections (Boyd & Fales, 1983).

To summarize the key points in these descriptions of reflective thinking, one could say that reflection is: (1) an internal examination or consideration of an issue of concern; (2) an active, purposeful process pursued with intent; (3) a key element in gaining new meaning from
experience; and (4) an inherently individual process even though it may take place in association with others.

A survey of the literature on reflective thinking reveals a wide diversity of contexts for and approaches to reflective thinking, each with its own unique perspective on the purposes, processes, and outcomes of reflection. John Dewey describes reflective thinking as a problem-solving process in which hypotheses are formulated, data are gathered, and hypotheses are tested. Theorists like Kolb and Pry (1975) and Boud, Keogh, and Walker (1985) view reflection as one key element in a larger cycle of learning from experience. Boyd and Fales (1983), reflecting their interest in guidance and counseling, approach reflective thinking as a tool for enhancing personal adjustment, change, and growth. Donald Schoen (1983, 1987) approaches the process of reflection from yet another perspective: the reflective thinking of professionals in the course of daily practice. MacKinnon (1987), Cruickshank, (1986b), and Korthagen (1985) relate their work on reflective thinking to preservice teacher education. Each of these writers can contribute to our understanding of reflective thinking. Their diversity in perspective does not contradict or confuse; rather, it adds richness and depth to our knowledge of the complex phenomenon of reflective thinking.
Reflective Thinking: A Problem-Solving Approach

In *Democracy and Education* (1916), Dewey discusses the importance of reflection in learning from experience, distinguishing between trial-and-error activity and reflective activity. In the trial-and-error method, "we simply do something, and when it fails, we do something else, and keep on trying till we hit upon something which works, and then we adopt that method as a rule of thumb measure in subsequent procedure" (p. 169). In reflective activity, on the other hand, there is an "intentional endeavor to discover specific connections between something which we do and the consequences which result" (p. 170). Dewey believed it was this kind of activity that enabled effective problem-solving to take place and that it improved the effectiveness of learning (Boud, Keogh, & Walker, 1985).

In other words, reflection on experience is a kind of learning loop, continually feeding back and forth between the experience and the relationships being inferred.

Dewey (1916) summarized the general features of a reflective experience as follows:

(i) perplexity, confusion, doubt, due to the fact that one is implicated in an incomplete situation whose full character is not yet determined;

(ii) a conjectural anticipation -- a tentative interpretation of the given elements, attributing to them a tendency to effect certain consequences;
(iii) a careful survey (examination, inspection, exploration, analysis) of all attainable consideration which will define and clarify the problem in hand;

(iv) a consequent elaboration of the tentative hypothesis to make it more precise and more consistent, because squaring with a wider range of facts;

(v) taking one stand upon the projected hypothesis as a plan of action which is applied to the existing state of affairs; doing something overtly to bring about the anticipated result, and thereby testing the hypothesis. (p. 176)

For Dewey, then, reflective activity was a cycle of sensing a problem, observing conditions, forming and elaborating upon suggested conclusions, and active experimental testing. To do otherwise, according to Dewey, is to be governed by routine, tradition, or authority.

Reflective Thinking: A Key Element in the Learning Process

While reflective thinking can focus on problem situations and problem-solving, reflection also occurs in many other circumstances. Some theorists point out the vital role that reflection plays in the learning process. Kolb and Fry (1975), for example, illustrate the central role of reflection in their experiential learning model. According to Kolb and Fry (1975), learning, change and growth are best facilitated by an integrated process that begins with (1) experience followed by (2) collection of data, observations and reflections on that experience, which are then (3) analyzed and used in (4) the modification of behavior and choice of new experiences.
Figure 1. The Experiential Learning Model (Kolb and Fry, 1975)

Learning is thus conceived as a four-stage cycle (see Figure 1). Immediate concrete experience is the basis for observation and reflection. An individual uses these observations to build an idea, generalization, or theory from which new implications for action can be deduced. These implications or hypotheses then serve as guides in acting to create new experiences (Kolb, 1981).

Kolb (1981) argues that individuals, if they are to be effective learners, need four different kinds of abilities: concrete experience abilities, reflective observation abilities, abstract conceptualization abilities, and active experimentation abilities. In other words, individuals must be able to involve themselves fully, openly, and without bias in new experiences; they must be able to reflect on and observe these experiences from many perspectives; they must be able to create concepts that integrate observations into
logically sound theories; and they must be able to use these theories to make decisions and solve problems.

The British Further Education Curriculum and Development Unit (FEU) (1981) proposes another model that, like the experiential learning model, gives reflection a central place in learning. The FEU model has three phases: the experience of the learner, the specific learning which occurs on the basis of that experience, and the reflective activities which are needed to extract specific learning from the overall experience (see Figure 2).

According to the FEU authors (1981), the individual’s experience needs to be followed by organized reflection. This reflection enables the individual to learn from the experience, crystallizing and reinforcing previous learning, developing concepts and generalizations for future use, and helping to identify need for additional learning before further experience is acquired.
Experience

existing and as extended
by company, college or
other agency

giving material for

Preparatory to more

Specific Learning
usually of skills and
knowledge and varying
from individual to
individual

indicating need for

Reflection

guiding by tutor,
usually serving to
consolidate, interpret
and pattern; develop
concepts and theories
perceive attitudes and
values as well as...

Figure 2. The FEU Model
(British Further Education Unit, 1981)
Boud, Keogh, and Walker (1985) present yet another model of the learning process giving a central role to reflective thinking. This model consists of three basic components: experience, reflection, and outcomes (see Figure 3). Experience, in this model, consists of the total response of a person to a situation or event: what he or she thinks, feels, does, and concludes at the time and immediately thereafter. Reflection is the processing phase occurring after the experience: recapturing the experience, thinking about it, mulling it over, and evaluating it. The outcomes of reflection in this model include new ways of doing things, clarification of issues, development of skills, or the resolution of problems.

Boud, Keogh, and Walker (1985) state that one of the most important ways of enhancing learning is to strengthen the link between the learning experience and the reflective activity which follows it; for instance, by incorporating into learning activities a specific allocation of time which can be used for reflection. The authors also list three elements which they believe are important in the reflective process itself: returning to experience, attending to feelings, and re-evaluating experience. Returning to experience is simply the recollection of the salient events, the replaying of the initial experience in the mind or the recounting to others of the features of the experience. Attending to feelings has two aspects: utilizing positive
feelings and removing obstructing feelings. The third stage of re-evaluating experience involves re-examining experience in the light of the learner's intent, associating new knowledge with that which is already possessed, and integrating this new knowledge into the learner's conceptual framework. It leads to an appropriation of this knowledge into the learner's repertoire of behavior. This can involve a rehearsal in which the new learning is applied mentally to test its authenticity and the planning of subsequent activity in which this learning is applied in one's life.

Figure 3. A Model of Reflection in the Learning Process (Boud, Keogh, & Walker, 1985)
Reflective Thinking: A Tool for Personal Change and Growth

In contrast to these models emphasizing structured learning experiences designed to stimulate reflection, Boyd and Fales (1983) approach reflection from the context of personal counseling, change and growth. From this perspective, reflection is viewed as a spontaneous, private, self-induced process of creating and clarifying meaning in terms of self and in terms of self in relation to the world. The issue or experience that is explored focuses around or embodies a concern of central importance to the self, and the outcome of the process is a changed conceptual perspective.

Boyd and Fales (1983) emphasize the individual and self-based nature of reflection, noting that:

Reflection is not a one-way, linear process; it is more comparable to alternating current, flowing back and forth between intense focusing on a particular form of experience and outer experience; often triggered by some external experience, yet seriously hampered by high levels of external or internal demand to react. (p. 105)

Boyd and Fales (1983) base their description of the reflective learning process on the analysis of three distinct sets of data: (1) repeated, open-ended, nondirected interviews with a purposive sample of nine counselors, all volunteers and self- or referral-identified as reflective persons; (2) structured interviews and self-report questionnaires from a sample of 69 adult
educators; and (3) open-ended, self-report responses to a five-item questionnaire on reflection from 33 graduate students and practicing counselors. Through analysis of this data, Boyd and Fales abstracted the following generalized process of reflective learning:

(1) A sense of inner discomfort, an awareness that something does not fit, or does not sit right within the individual.

(2) Identification or clarification of the concern. In the first stage, the nature of the problem is not usually fully conscious; in this second stage there is a more complete identification or clarification of the problem as experienced by the self.

(3) Openness to new information from internal and external sources, with the ability to observe and take in from a variety of perspectives. This sense of openness takes the forms, among others, of reviewing past experience, foregoing the need for immediate closure on the issue, talking with someone else, postponing decisions until they can be looked at from all sides, and asking oneself difficult questions.

(4) Resolution of the problem or issue, expressed as "integration," "coming together," "acceptance of self-reality," and "creative synthesis." This is the point at which people experience themselves as changed, having learned, or having come to a satisfactory point of closure in relation to the issue.

(5) Establishing continuity of the changed self with past experiences, present life, and future behavior. Research respondents described this state in terms of reviewing past values in relation to the changed perspective, evaluating the change as better for the self, applying the new perspective to a variety of additional issues, planning for future behavior consistent with the changed perspective, and examining the implications of the change for future behavior and other meanings.

(6) Deciding whether to take action; attempting to "figure out" how the changed perspective will work in
practice; evaluating how the change will be received by others. (p. 106-112)

According to Boyd and Fales, the third stage, openness to new information, is the stage of the reflective learning process that is most amenable to intervention on the part of educators and counselors. Research has also shown that training in reflective strategies, as well as simply helping people to become aware of the process, can enhance their reflective learning skills (Boyd & Fales, 1983).

**Reflective Thinking in Professional Practice**

Donald Schoen (1983, 1987) approaches the process of reflection from yet another perspective: the "reflection-in-action" of professionals in the course of daily practice. Based on his study of reflective practitioners in the fields of architecture, psychotherapy, city planning, and management, Schoen conceptualized a model of reflection-in-action that emphasizes the artistic, intuitive processes which reflective practitioners bring to situations of uncertainty, instability, uniqueness, and value conflict.

According to this model of reflection-in-action, the practitioner engages in a "reflective conversation" with the problem situation, responding to the complexities of the current case, recognizing both similarities to other cases and the unique qualities of the particular case. Frames are imposed and bring to attention certain aspects of phenomena:
When we set the problem, we select what we will treat as the "things" of the situation, we set the boundaries of our attention to it, and we impose upon it a coherence which allows us to say what is wrong and in what directions the situation needs to be changed. Problem setting is a process in which, interactively, we name the things to which we will attend and frame the context in which we will attend to them. (p. 40)

Once frames are imposed and problems are set, actions that entail certain solutions are formulated. The practitioner then examines the intended and unintended consequences and implications of the selected course of action. At times these efforts provoke unexpected outcomes that give the situation new meanings, resulting in a need to reframe the problem and examine it in a new context.

Schoen (1983) notes that what the practitioner sees in the situation and how the practitioner frames the situation depend fundamentally on his or her conceptual repertoire, "a repertoire of examples, images, understandings, and actions... includ[ing] the whole of his experience insofar as it is accessible to him for understanding and action" (p. 138). The range and variety of the repertoire that the practitioner brings to unfamiliar situations determines to a large extent the success of the practitioner in resolving the problem situation satisfactorily.

Schoen (1987) summarizes the process of reflection-in-action as follows:

Design professionals such as architects and urban designers, along with practitioners of such professions as law, management, teaching, and engineering, deal
often with uncertainty, uniqueness, and conflict. The nonroutine situations of practice are at least partly indeterminate and must somehow be made coherent. Skillful practitioners learn to conduct frame experiments in which they impose a kind of coherence on messy situations and thereby discover consequences and implications of their chosen frames. From time to time, their efforts to give order to a situation provoke unexpected outcomes - "back talk" that gives the situation a new meaning. They listen and reframe the problem. It is this ensemble of problem-framing, on-the-spot experiment, detection of consequences and implications, back talk and response to back talk, that constitutes a reflective conversation with the materials of a situation - the design-like artistry of professional practice. (p. 157-158)

MacKinnon (1987) utilized Schon's conceptualization of reflection-in-action in an analysis of preservice teachers' reflections on their teaching performances. These reflections, verbalized in the context of supervisory conferences, were analyzed for cycles of reflection. MacKinnon's "cycle of reflection" is based on Schon's notion of reflection-in-action, and consists of three phases: (1) initial problem setting, (2) reframing, and (3) resolve.

In phase one, initial problem setting, an initial problem is constructed from the preliminary analysis of a teaching episode. The teacher or supervisor begins this phase by calling to attention certain aspects of the teaching, or of the classroom events more generally, which are problematic. MacKinnon (1987) gives the following example of problem setting from a clinical supervision discussion. In critiquing her class discussion, the student
teacher (Wendy) set or framed the problem by commenting that she should have pushed the students in her class to explain their answers more, and that the students did not give the answers she was looking for.

In phase two of MacKinnon's cycle, the problematic phenomenon is re-examined from one, or perhaps several perspectives. Counter examples are constructed and contrasted to the problematic phenomenon. The result of the reframing process is a deeper understanding of the problematic phenomenon. In the previous example, the student teacher (Wendy) initially framed the problem in terms of a negative evaluation of her questioning techniques and of the answers given by her students. In phase two of the reflective cycle, Wendy's supervisor reframed the problem by evaluating her classroom questions favorably and by noting that Wendy had indeed asked specific questions leading the students to the desired concepts. The supervisor also helped Wendy to see that although the students didn't respond in exactly the way Wendy wanted, they were actually understanding her questions and responding appropriately. As a result of these comments, Wendy was able to see the phenomenon from the more positive perspective held by her supervisor.

In phase three of the reflective cycle, a new conclusion about the problematic phenomenon is formulated, and a new implication for future instruction is derived.
The previous example was resolved when Wendy formulated the new conclusion that the students actually had come up with the answers she was looking for, even if they weren't phrased exactly the way Wendy would have phrased them. Wendy's new implication for instruction was that in the future she should accept such answers.

Based on his study, MacKinnon (1987) concluded that preservice students can and do exhibit reflective thinking, and that the "reflective cycle" can appropriately be applied to studying reflection among preservice teachers.

Reflective Thinking in Teacher Education

Cruickshank (1986b) proposes another model of reflective thinking in the context of preservice teacher education (see Figure 4). In Cruickshank's model, a problematic teaching or classroom situation triggers reflective thought. This reflective thought results in increased teacher wisdom, which can then be applied in new teaching situations. Cruickshank (1987) bases his model on Dewey's (1916) suggestion that good habits of thought are engendered by providing actual situations or experiences that initiate and provoke reflection. In teacher education, these situations should be those actually experienced by teachers (Cruickshank, 1987).
Figure 4. The Cyclical Process of Thinking/Thought
(Cruickshank 1986b)

According to Cruickshank (1986a), meaning can be constructed from experience by discussion or by introspection. Cruickshank also argues that certain contextual prerequisites are necessary for this to occur: (1) an experience worthy of note; (2) motivation to learn about and from the experience; (3) a framework that directs attention to salient features of the event; and (4) provision for transferring what is learned to similar, future experiences.

In an effort to provide such a context for reflection among preservice teachers, Cruickshank and associates (1980) developed Reflective Teaching, a peer teaching activity designed to stimulate careful, thoughtful consideration of the teaching/learning process. Reflective Teaching has been used in many teacher education programs with considerable success and will be discussed more fully in a later section of this chapter.
Korthagen (1985) proposes a five-phase model of reflective learning similar to that described by Dewey (1916). Like Cruickshank's (1986b) model for preparing reflective teachers, Korthagen's ALACT model is set in the context of preservice teacher education. According to Korthagen, five phases can be distinguished in reflective learning: (1) action, (2) looking back on the action, (3) awareness of essential aspects, (4) creating alternative methods of action, and (5) trial (see Figure 5). In this model the fifth phase, or trial stage, is also the first phase or action stage of the next cycle.

Korthagen's (1985) model recognizes the inherently individualistic nature of reflection, yet emphasizes the facilitating role that others can play in the development of reflective thinking. In a teacher education program based on this model, teacher educators play a facilitating role by providing initial structure, indicating possible choices, and giving feedback. At all times, positive interpersonal relationships between the teacher educator and the student are emphasized: acceptance, empathy, and genuineness rather than continuous evaluation and criticism. In this way, students are encouraged to take responsibility for self-reflection and self-evaluation (Korthagen, 1985).
Figure 5. The ALACT Model
(Korthagen, 1985)
Cognitive Processes Involved in Reflection

Despite the differing perspectives of the models and theories presented above, each one can deepen our understanding of the processes, requisites, purposes, and outcomes of reflective thinking. From these models and from other less detailed discussions of reflective thinking, it is possible to extract some of the basic processes that occur during reflection:

-exploring and examining an experience, past or present, in order to create and clarify the meaning of that experience (Cruickshank, 1986a; Boyd & Pales, 1983; Shapiro, 1985)

-gathering, organizing, examining, analyzing, and evaluating information which will define and clarify the situation at hand (Cruickshank, 1982; Dewey, 1916; Goodman, 1984; Kolb & Fry, 1975; Korthagen, 1985)

-bringing past experiences to bear on the problematic phenomenon; recognizing both similarities and differences between past situations and the current case (Schoen, 1983, 1987)

-questioning those aspects of a situation that are customarily taken for granted (Cruickshank, 1987; Goodman, 1984; Tom, 1985; Zeichner, 1981-82; Zeichner & Liston, 1987)
- being open to re-examining the problematic phenomenon from a variety of perspectives (Boyd & Fales, 1983; Schoen, 1983)
- analyzing classroom situations in terms of significant educational, social, and ethical issues (Erdman, 1983; Feiman, 1979; Goodman, 1984; Zeichner & Liston, 1987)
- using creativity and intuition in interpreting and analyzing problematic situations (Goodman, 1984; Schoen, 1987)
- creating alternative courses of action and examining and evaluating their intended and unintended consequences (Boyd & Fales, 1983; Korthagen, 1985; Schoen, 1987)
- selecting a plan of action based on an informed decision and then monitoring the effects of that action (Cruickshank, 1986b; Dewey, 1916; Feiman, 1979; Korthagen, 1985; Parsons, 1983; Zeichner & Liston, 1987)
- formulating abstract concepts, generalizations, and theories from which new implications for action can be deduced (British Further Education Unit, 1981; Cruickshank, 1986b; Grundy, 1982; Kolb & Fry, 1975)
testing the implications of these concepts in new situations (Cruickshank, 1986b; Kolb & Fry, 1975; Korthagen, 1985)

**Attitudes Necessary for Reflection**

In addition to these cognitive processes, the affective domain also plays a vital role in reflective thought and action. Reflective thinking is a complex process in which both feelings and cognition are closely interrelated and interactive. In discussing the process of reflecting on one's experiences, Boud, Keogh, and Walker (1985) note that:

Negative feelings, particularly about oneself, can form major barriers toward learning. They can distort perceptions, lead to false interpretations of events, and can undermine the will to persist. Positive feelings and emotions can greatly enhance the learning process; they can keep the learner on task and can provide a stimulus for new learning. The affective dimension has to be taken into account when we are engaged in our own learning activities, and when we are assisting others in this process. (p. 11)

In discussing the attitudes essential for reflective thought, many educators refer to three attitudes or character traits identified by Dewey (1933) as prerequisite to reflective action: openmindedness, responsibility, and wholeheartedness.

Openmindedness is defined by Dewey (1933) as:

... freedom from prejudice, partisanship, and such other habits as close the mind and make it unwilling to consider new problems and entertain new ideas.... It includes an active desire to listen to more sides than
one; to give heed to facts from whatever source they come; to give full attention to alternative possibilities; to recognize the possibility of error even in the beliefs that are dearest to us. (p. 30)

In applying Dewey's discussion of openmindedness to teacher education, Zeichner (1981-82) describes openmindedness as "the antithesis of uncritical acceptance of the order of the school...for reflection to occur, there must first and foremost be a critical appraisal of the official labellings and legitimations of the school culture" (p. 6). Goodman (1984) adds that students who are openminded "examine the rationales that underlie what they may initially take for granted as right and natural in the schools...they are willing to question their own views of and reactions to the school culture" (p. 20).

It is not enough, however, to simply be open to a variety of ideas; there must also be an attitude of intellectual responsibility (Dewey, 1933). To be intellectually responsible, according to Dewey, is to consider the consequences of a projected step and to be willing to accept those consequences when they follow reasonably from any position already taken. In the context of teacher education, this means preservice teachers must ask why they are doing what they are doing in classrooms (Cruickshank, 1987), and they must determine what the educational, psychological, and social consequences of their actions are (Goodman, 1984).
The final attitude identified by Dewey (1933) as essential for effective thought is wholeheartedness. Dewey describes wholeheartedness as being thoroughly interested in some object or cause:

When a person is absorbed, the subject carries him on. Questions occur to him spontaneously; a flood of suggestions pour in on him; further inquiries and readings are indicated and followed; instead of having to use his energy to hold his mind to the subject (thereby lessening that which is available for the subject, itself, and creating a divided state of mind), the material holds and buoys his mind up and gives an onward impetus to thinking. (p. 32)

In the context of preparing reflective teachers, wholeheartedness has been described as "genuine enthusiasm" (Ross & Hannay, 1986), "internal strength necessary for genuine reflection" (Goodman, 1984), and confidence and self-reliance (Ross, 1987). Zeichner and Teitelbaum (1982) note that very few student teachers exhibit wholeheartedness. Rather, much of the energy of the student teacher is spent in presenting a favorable image to school and university supervisors in the hope of attaining favorable evaluations. This results in divided interests and diverts the student's attention away from a critical analysis of the classroom and school (Zeichner & Teitelbaum, 1982). Wholeheartedness, in contrast, enables students to work through their fears and insecurities, and, therefore, it gives them the courage to analyze and evaluate the schools.
society, children, education, and themselves (Goodman, 1984).

These attitudes of openmindedness, responsibility, and wholeheartedness, together with the cognitive processes described earlier, constitute reflective thinking, a powerful tool which empowers one to learn from experience, to continue growth as a self-directed learner, and to move beyond the uncritical acceptance of traditional beliefs, values, and actions.

Preparing Reflective Teachers

The preparation of reflective teachers is a goal which has a long history in teacher education. Since 1904, when John Dewey wrote that it is more important to make teachers "thoughtful and alert students of education" than it is to help them gain immediate proficiency, teacher educators for the most part have agreed that the major goal of teacher education programs is to prepare teachers to be lifelong students of teaching. Too great a focus on the basic skills and abilities needed for initial practice may result in teachers who are able to cope sufficiently with life as a beginning teacher, but who may not prosper over time because they have not developed higher-level thinking skills with regard to their teaching (Cruickshank, 1987). As Dewey
warned, "immediate skill may be got at the cost of power to go on growing" (p. 15).

Additionally, very few teacher educators would accept the view that it is possible to equip a prospective teacher with all of the knowledge and skills that he or she will need for an entire career (Zeichner, 1981-82). No teacher education program, no matter how good, can produce a fully developed teacher at the preservice level because we cannot specify all the situations in which teachers will find themselves, nor can we specify what actions would be appropriate in every situation. Each teaching situation consists of a unique combination of personalities, constraints, and opportunities. Teacher behavior that is sensible and effective in one setting may be inappropriate in a second setting. Because we cannot identify all teacher or student characteristics that help determine the appropriateness of various actions, we cannot train teachers to use the available skills and methods in a way that will guarantee effective teaching (Borko & Shavelson, 1983). Rather, teacher education programs must help prospective teachers become reflective, reasonable decision-makers who critically examine their own teaching, thinking, and decision-making strategies.

Such "students of teaching" would have a high and continuing interest in the subtleties of the art and science of teaching, wanting to learn all they can about teaching
from both theory and practice, and deliberating on their actions rather than behaving according to impulse, tradition, and authority (Cruickshank, 1987). They would inquire into classroom behavior and situations, and would analyze what has happened in relation to what could happen, thus gaining new insights and knowledge about the process of teaching and learning (Erdman, 1983). They would be both willing and able to reflect on the origins, purposes, and consequences of their actions, as well as developing other habits and skills necessary for self-directed growth and learning (Zeichner & Liston, 1987). They would be cognizant of their own "theories-in-use," willing to hold these theories tentatively, and ready to change them as the context changed (Trumbelí, 1986). Instead of acquiring the "outward form of method," such teachers would develop "the capacity to put it to educative use" (Dewey, 1904).

According to Cruickshank (1986b), wise teachers would be more likely to examine, inquire, reason, deliberate, and reflect. They would engage in such activities actively, continuously, self-consciously, introspectively, and authentically. Representative behaviors that distinguish wise teachers include the following:

- greater awareness of the conscious and unconscious determinants of behavior
- greater willingness to hear and consider alternative views; more open-mindedness
- less superstitiousness or naivety in thinking, and, thus, a greater likelihood to disregard unfounded commitments about schooling, learning, and teaching
- consciously derived goals that justify and direct classroom experiences
- greater likelihood of recognizing and responding to classrooms as complex phenomena
- better describe proposed educational experiences and outcomes for pupils
- teach in ways that are more likely to have maximum benefits for learners, and
- seek out, examine, and use information about teaching in general and their own teaching habits in particular (p. 22)

Problems in the Development of Reflective Teachers

As important as the goal of preparing reflective teachers may be, few if any teacher education programs report notable successes in this endeavor. Rather, the teacher education literature is filled with descriptions of partially successful programs and the problems encountered when attempting to develop habits of reflective thought among preservice teachers (see, for example, Goodman, 1984; Korthagen, 1985; Ross, 1987; Zeichner, 1987; Zeichner & Liston, 1987).

One of the problems noted by several teacher educators is the historically dominant apprenticeship view of student teaching and other field experiences. In the apprenticeship perspective, firsthand experience is viewed as the process by which students come to terms with the "real world," the world of practiced performers into which the novice is initiated (Buchmann & Schwille, 1983). The assumption is that the greater the number of hours spent in the classroom,
the more prepared students will be upon entering the profession. But, as Dewey (1938) points out, not all experiences are genuinely or equally educative, and some experiences are miseducative. In teacher education, such miseducative experiences can occur if there is a lack of opportunity for reflection (Erdman, 1983). The apprenticeship perspective, consciously and unconsciously, encourages the novice to model the master teacher, and studying teaching then becomes much less important than "correct" performance based on some local standard (Cruickshank, 1987).

Developmental theorists in teacher education have noted that although teaching experiences are ubiquitous, there must be a better balance between merely providing them and making available an opportunity to reflect on them (Cruickshank, 1987). Sprinthall (1980), for example, has concluded that providing more teaching experience is not necessarily better:

In addition to real experience there is a need for careful and continuous guided reflection. In a Deweyan sense, this means that unexamined experience misses the point.... Teaching persons how to ask questions, examine experiences from a variety of views, etc., is at least co-equal to real experience as a growth stimulus. (p. 288)

To date, research has shown that, for the most part, field experiences in teacher education fail to enhance students' reflectivity. Studies by Iannocone (1963),
Tabachnik (1980), and Tabachnik, Popkewitz, and Zeichner (1979-80) found that student teachers in general become more authoritarian, less flexible, less responsive to pupils, and more rigid in their classroom behavior during their student teaching experiences. Because most field experiences emphasize managing basal textbook programs and keeping children on task, they often contribute to student teachers' passivity as they learn how to merely fit into the established patterns of traditional school practice, rather than learning to become more experimental, reflective, and active in their approach to education. Goodman (1986) summarizes the problem as follows:

Rather than learning to be craftspeople who are active in developing curricula based upon their own and/or their pupils' interests and who are able creatively to use materials, personal talents, and innovative resources in planning and implementing learning activities; pre- and inservice teachers are becoming passive technicians who merely learn to execute pre-packaged 'instructional programs.' Instead of providing an opportunity to experiment within practicum sites and reflect upon substantive concerns of education, field experiences often systematically narrow students' conceptions of teaching and learning. As Dewey (1904) warned, many students learn to be technically proficient during their field experiences but at a cost to their professional growth. (p. 112)

Part of the problem with developing reflectivity through field experiences may be due to the discrepancies that often occur between the ideas developed in university coursework and the practices encountered and expected within the field (Erdman, 1983; McCaleb, 1979). The structure of
the school day, the use of pre-determined curriculum materials and the typical school emphasis on order and control frequently limit the ability of students to experiment with new ideas and methods or to reflect about the consequences of their actions (Ross, 1987). These limitations are especially powerful constraints upon student teachers because of their desire to fulfill the expectation of the practicum site (Goodman, 1984) and because students have little or no control over decisions about what is taught or how it is taught (Ross, 1987). Additionally, time to reflect is often very limited or not available during early teaching experiences (Cruickshank, 1987; Holton, 1984; Korthagen, 1985).

The incoming attitudes of students are also cited by teacher educators as a problem in the development of reflectivity in students (Korthagen, 1985; Ross, 1987; Zeichner & Liston, 1987). Many initial attitudes and expectations must be "unlearned" before students can begin to be reflective (Ross, 1987). Korthagen (1985), for example, notes that many students enter teacher education expecting teacher educators to "tell them the answers" rather than viewing teaching as a problem-solving process. This expectation, coupled with their years of experience as passive students, makes it difficult for students to view inquiry and reflection as essential ingredients for learning about teaching.
Another problem discussed in the literature involves the limitations of the college instructors themselves. Erdman (1983) and Goodman (1986) have noted that instructors fail to encourage the connection of theory to practice and fail to encourage serious reflection about practice. Tabachnik, Popkewitz, and Zeichner (1979-80) found that many instructors actually discouraged reflection by reinforcing the students' ideas that the most important part of student teaching is to fit in, get along, and get good recommendations. Ross (1987) notes that in order to truly enhance reflectivity among students, the instructors must themselves be reflective, have well developed communication skills, intense interest in the development of individual students, and a willingness to devote considerable time to instruction. Finding faculty and graduate students with this combination of skill, energy and commitment is a difficult task, especially given the heavy work load of graduate students and the transitory nature of their assignments (Zeichner & Liston, 1987).

Relatedly, the nature of instruction in the university as a whole has been cited as a factor inhibiting the development of reflective teachers. Zeichner (1981-82) notes that "we cannot expect students to see the value of reflection in their teaching if our pedagogy forces them into the conventional role of passive students" (p. 16). Ross and Hannay (1986) summarize the problem as follows:
If university instructors, while overtly advocating reflective inquiry, model passive and expository instructional techniques, then how can change be facilitated? Rather than being a link in a continuing chain of passivity, the university should provide an interactive and critical model of pedagogy. However, such involvement and lack of passivity is not developed through teaching by lecture/discussion techniques; it occurs through experience in doing. Students must practice inquiry skills in order to internalize an image of reflective teaching and consequently employ these approaches in their classrooms....The university classroom must become the venue for advocating reflective inquiry, a laboratory where such practices are modeled, experienced, and reflected upon. (p.12)

The role of instruction in teacher education, then, should be the role of empowering preservice teachers to teach reflectively by providing an environment that exemplifies inquiry instruction and classroom interaction (Ross & Hannay, 1986).

**Instructional Strategies for Preparing Reflective Teachers**

Because of the importance of preparing reflective teachers and because of the apparent inability of traditional teacher education programs to do so, several teacher educators have designed programs and/or specific instructional strategies with the intention of developing reflective thinking abilities in preservice teachers. Conceptualizations have been developed and programs have been implemented which have as their central aim the development of teachers who have the skills and dispositions to continually inquire into and reflect on their own teaching practices (Zeichner, 1987).
One question addressed frequently in the literature on reflection and teacher education is the question of what should be the focus of students' reflection; i.e., what should preservice teachers reflect about? Many teacher educators writing on this topic utilize Van Manen's (1977) conception of "levels of reflectivity" (see, for example, Goodman, 1984, 1986; Ross, 1987; Ross & Hannay, 1986; Zeichner, 1981-82, 1987; Zeichner & Liston, 1985, 5987; and Zeichner & Teitelbaum, 1982). Van Manen identifies three levels of reflection, each one emphasizing a different focus. The first level of reflection, technical rationality, is concerned with the specific techniques needed to attain stated objectives. At this level, the focus is on the efficient and effective application of educational knowledge for the purposes of attaining ends which are accepted as given (Zeichner & Liston, 1987).

The second level of reflection, according to Van Manen (1977), focuses on clarifying the assumptions and predispositions underlying educational practices and assessing their educational consequences. This level of reflection involves the assessment of the educational implications and consequences of both actions and beliefs. Students reflecting at this level would consider the worth of competing educational goals and would assess the rationale for educational practices.
The third level of reflection, critical reflectivity, addresses both ethical and political concerns as part of educational discourse (Goodman, 1984). At this level the central questions ask which educational goals, experiences, and activities lead toward forms of life which are mediated by concerns for justice, equity, and concrete fulfillment, and whether current arrangements serve important human needs and satisfy important human purposes (Zeichner & Liston, 1985). Students reflecting at this level would consider the link between classroom life and broader social forces and structures (Goodman, 1986).

Similar to Van Manen's (1977) conceptualization of levels of reflectivity is Tom's (1985) notion of "the arena of the problematic." According to Tom, the process of making the teaching situation problematic is central to inquiry and reflection. Tom describes this process as follows:

Significantly we speak of making a teaching situation problematic, a gerund that suggests a conscious attempt on the part of the teacher to suspend judgment about some aspect of the teaching situation and, instead, to consider alternatives to established practice. To make teaching problematic is to raise doubts about what, under ordinary circumstances, appears to be effective or wise practice. The object of our doubts might be accepted principles of good pedagogy, typical ways teachers respond to classroom management issues, customary beliefs about the relationship of schooling and society, or ordinary definitions of teacher authority -- both in the classroom and in the broader school context. (p. 37)
Tom (1985) points out that while there is consensus on the need to make some aspects of teaching problematic, no consensus exists among teacher educators concerning which aspects of teaching should be the focus of problematic thinking. According to Tom, the various inquiry-oriented programs can be placed along a dimension or continuum based on their focus of reflection, from the "teaching-learning process" at one end to "society" at the other end. In between these two poles of the continuum are such intermediate arenas as "subject matter knowledge" and "teaching, including underlying ethical and/or political principles" (see Figure 6).

Like Van Manen's (1977) levels of reflectivity, Tom's conceptualization of the arena of the problematic illustrates that, while varying programs may subscribe to the centrality of reflection and inquiry in teacher preparation, they may, in fact, vary considerably in terms of their focus or content for reflection.
Figure 6. Arenas of the Problematic
(Arranged by degrees of comprehensiveness)
(Tom, 1985)
According to Cruickshank (1987), any experience that, first, engages perservice or inservice teachers with reality (or a model of reality) and, second, causes them to reflect on what happened qualifies as a potential reflective teaching experience. Instructional alternatives identified in the literature as having such potential include action research, ethnography, journals (writing), observation systems for analyzing classroom events, simulations, protocol materials, clinical supervision, seminars, and Reflective Teaching. In each of these alternatives, the intention is to make teachers more thoughtful and wiser by encouraging them to examine and give careful consideration to teaching (Cruickshank, 1987).

**Action research.** In action research, each teacher is viewed as needing to study his or her own situation to understand better the dynamics of the teaching-learning process (Tom, 1985). The purpose of action research is to solve classroom problems and to determine the outcomes of various courses of action. It is a means by which teachers can attempt to improve the educational process, at least within their own environment.

In the context of teacher education, preservice teachers can be encouraged to complete action research projects within the context of their field placements. Zeichner and Liston (1987) describe the use of action
research projects in one teacher education program as follows:

The action research projects completed by student teachers involve the adaptation of a framework for conducting classroom action research developed at Deakin University in Australia (Kemmis & McTaggart, 1982). This framework includes the following stages: reconnaissance, planning, acting, observing, and reflecting. Projects are written up by students and shared in the seminar groups. Some students have experimented in the classroom with different grouping strategies in order to assess their effects on maintaining pupil involvement; for example, some have examined a student teacher's behavior toward high- and low-ability groups in reading, while other student projects involved experimentation with different teaching methods. These included an automatic reading program designed to supplement a basal program, and a math program, based primarily on concrete and manipulative materials, for pupils showing little success with the standard math curriculum. Many of these projects were planned collaboratively and carried out by student teachers and other staff in their schools. (p. 31-32)

Little or no research is available on the use of action research to improve preservice teachers' reflectivity. What does exist are presentations of the case for the use of action research without any empirical validation of the claims made, and very general statements of the presence of the benefits made on the basis of observations of student teacher discussions of action research projects during seminars or on the basis of comments made by student teachers in course evaluation forms or in writeups of action research projects (Zeichner, 1987).
Ethnography. Several teacher educators have advocated the use of ethnographic methods as a strategy for preparing more reflective teachers, both within campus-based courses and field experiences (Zeichner, 1987). In both cases, students utilize ethnographic methods, particularly interviews and observation, to study various aspects of schools, classrooms, curriculum, and teacher-pupil interactions.

Most teacher educators using this approach advocate a wide focus for reflection, corresponding to Van Manen’s (1977) second and third levels of reflectivity (see, for example, Zeichner & Liston, 1987, and Zeichner & Teitelbaum, 1982). Students are encouraged to explore the ideological nature of curriculum, pedagogy and evaluation and the interrelationships between these socially constructed practices within the school and the social, economic and political contexts in which they are embedded (Zeichner, 1987). In one such program described by Zeichner and Teitelbaum (1982), students examine selected features of the schools in which they are teaching (e.g., internal history, rules and regulations, stated philosophy, architecture, facilities), their classrooms (e.g., rules and regulations, location of desks, materials, etc.), the hidden curriculum (e.g., in instructional materials, teachers’ language, and classroom interactions), and grouping and labeling procedures in the school. The intent is to help students
better understand how certain taken-for-granted aspects of the school and classroom impinge upon their teaching, their students’ behavior, and their relationships with other staff members and students (Zeichner & Teitelbaum, 1982).

While several claims have been made about the potential benefits which are likely to result from the use of ethnographic methods in teacher education, there has been very little attempt to directly assess the impact of the strategy. Zeichner (1987) summarizes the status of research on ethnography in teacher education as follows:

At most, isolated anecdotes are cited (e.g., Gitlin & Teitelbaum, 1983) to illustrate how specific students saw aspects of the hidden curriculum in a school that they weren’t aware of before or of how students saw possibilities for change that they hadn’t noticed or thought of prior to engagement in ethnography. This scattered evidence of the presence of some of the potential benefits of ethnography is interesting but is hardly sufficient. (p. 569)

In summary, while ethnographic methods show promise of helping to increase preservice teachers’ awareness of the consequences and underlying assumptions of school and classroom practices, the lack of research precludes any definitive claims.

**Writing/Journals.** Writing has been used to assess learning in preservice teacher education programs for many years, but recently a new focus for writing has emerged — using journals to foster personal and professional development. Using writing to facilitate learning, rather
than only to evaluate it, can encourage future teachers to synthesize the contents of their professional preparation programs (Stover, 1986). Reflective journal writing assignments can help prospective teachers seek out relevant memories and experiences that bear on topics from classroom management to evaluation processes and, at the same time, can promote the integration of those memories in solving problems and making decisions associated with good teaching (Stover, 1986). Yinger and Clark (1981) argue that through journal writing, students can learn four important things about themselves: (1) what they know, (2) what they feel, (3) what they do and how they do it, and (4) why they do it.

Several studies outside of teacher education have documented the effects of writing on stimulating higher levels of thinking and increased awareness of personal values and implicit theories, but empirical evidence supporting the role of writing in stimulating reflection about teaching is rather weak (Zeichner, 1987). As with ethnographic methods, course evaluations and student comments have supported the usefulness of journal writing to stimulate reflection, but clear empirical validation is not yet available.

**Systems for Analyzing Classroom Events.** During the 1960s and 1970s numerous systems were designed to record and analyze classroom events, enabling preservice teachers to
make a record of their teaching and consequently providing an opportunity to reflect on it (Cruickshank, 1987). The Flanders Interaction Analysis Categories (Flanders, 1970), for example, provide a means for classroom teachers to obtain a record of how they use verbal influence in the classroom. Classroom discourse is categorized and analyzed to answer such questions as:

How much of the time did the teacher talk? How much of the time did the students talk? How much of the time was silence or confusion evident? When the teacher talked, how much of the talk was given to accepting students' feelings, praising or encouraging, accepting or using students' ideas, asking questions, lecturing, giving directions, or criticizing or justifying authority? When the students talked, how much of the time were they responding to teacher-initiated contacts as compared with talk they initiated? (Cruickshank, 1987, p. 11)

Simulations. Simulations in teacher education provide opportunities for preservice teachers to learn about teaching by taking the role of a teacher in a model of a classroom teaching situation. Cruickshank's Inner-City Simulation Laboratory (1969), for example, asks students to take the role of a sixth-grade teacher. Cruickshank (1987) describes the process as follows:

[Students] are oriented to a hypothetical city, community, and school in which they work. They receive data on community agencies, cumulative record folders for their students, and a faculty handbook of school rules and regulations. Following an indeterminate period of study and reaction to the context and the materials, participants confront a series of complex
classroom problems. The problems are presented using films, role plays, playlets, written incidents, and combinations of these. Participants reflect on the situations and try to resolve the problems. The process includes individual problem analysis followed by group discussion in which participants are asked by other group members to reflect on their proposed solution. (p. 12)

An advantage of simulations is that they provide a "safe" setting in which teachers can experience classroom problems and practice problem solving and theory application. Another advantage is that they provide substantially greater control and direction over teaching experiences than can be provided in natural classrooms (Cruickshank, 1985a).

Little research has been conducted on simulations, and what little research is available does not focus on the degree or quality of reflection that is stimulated by participation in a simulation.

Protocols. A protocol is a record of an event or phenomenon of educational significance that is viewed by preservice teachers and then analyzed using related theory from education or the behavioral sciences (Smith, Cohen, & Pearl, 1969). Smith et al. suggest that these events of educational significance can come from classroom instructional situations as well as from situations that arise while planning school programs, working with other teachers and administrators, working with parents and other
members of the community, and working in professional organizations. An example given by Cruickshank (1987) is that of cheating in the classroom. After viewing a videotaped protocol of pupil cheating, preservice teachers would give careful consideration to the phenomenon of cheating and the accompanying teacher behavior, and would determine from the literature what is known about the antecedents and consequences of cheating behavior. In this way, students would already have given consideration to the phenomenon of cheating when they encounter it in the classroom.

Research conducted on the use of protocol materials in teacher education has focused primarily on determining whether, after using a protocol to introduce an educational concept, teacher education students can recognize that concept in operation when shown a film of a classroom in action (Cruickshank, 1985a). While research seems to confirm that concepts can be learned using protocols, no empirical evidence exists regarding the amount or level of reflection resulting from engagement with protocols.

Clinical Supervision. Clinical supervision, developed by Goldhammer, Anderson, and Krajewski (1980), emphasizes the rational analysis of classroom instruction and includes the following components: a preconference, observation of classroom instruction, analysis and strategy, and a
postconference. During the observation, supervisors compile detailed narrative notes which are used to document patterns and critical incidents in classroom instruction. During the postconference, teachers and supervisors together analyze the teaching process, consider whether objectives were achieved, identify unanticipated outcomes, and reflect on other dimensions of the teaching episode. Zeichner and Liston (1987), as well as other teacher educators, have implemented clinical supervision or modified forms of clinical supervision in an effort to promote reflection among preservice teachers. Other similar inquiry-oriented supervisory approaches implemented by various teacher education programs include "partnership supervision," "situational teaching," "horizontal evaluation," and "selective supervision" (Zeichner, 1987).

There is some evidence that supervisory conferences conducted in this way result in reflective discussions about teaching (Koskela, 1986; Zeichner & Liston, 1985), but again the lack of research in this area makes conclusions about the effects of clinical supervision tentative at best.

Seminars. Seminars that meet in conjunction with field-based student teaching have often been cited as promising settings for encouraging reflection, offering opportunities for students to relate educational theory to practice, to develop insight into themselves and their field
experiences, and to interact in an informal environment conducive to creative problem solving (Goodman, 1984). In many cases, this type of seminar has no formal structure or specified curriculum, emphasizing instead the importance of discovering personal meaning through exploration of self as well as ideas and experiences encountered in university courses and fieldwork. Through informal dialogue, students broaden their perspectives on teaching, consider the rationales underlying alternative possibilities for classrooms and pedagogy, and assess their own developing perspectives toward teaching (Zeichner & Liston, 1987).

According to Zeichner (1981), five elements are necessary for making the seminar an educative experience: (1) helping students to take a critical approach in the examination of educational issues or classroom problems; (2) helping students to see beyond the "paradigms" which circumscribe conventional thought about classroom practice; (3) helping students to develop a sense of the history of their own particular classroom and to examine the rationales underlying classroom and school regularities; (4) helping students to examine their own assumptions and biases and how these affect their classroom practice; and (5) helping students to examine critically the processes of their own socialization as teachers.

As with the other approaches, systematic research into the way in which students are affected by their
participation in this type of seminar has not been conducted.

**Reflective Teaching.** Reflective teaching is a form of peer teaching with an emphasis on reflection: thinking and talking about what happened as lessons were prepared, taught and evaluated. Cruickshank and Applegate (1981) describe reflective teaching as a four-step process:

In step one a group of teachers is divided into one or more groups of four to six persons, one of whom is designated the teacher for that group. The other group members become the learners.

In step two the designated teachers are each given an identical Reflective Teaching Lesson to teach, and in the interval before the peer groups are scheduled to meet again, they plan their instructional method.

Reflective Teaching Lessons have been carefully constructed with several points in mind. They must be capable of being taught in fifteen minutes or less. They must be interesting to teach and interesting to learn. Their content must be relatively unique, not normally a part of academic subjects with which the learners would already be familiar. Finally, they must assess student learning and student satisfaction.

In step three, when the peer groups meet again, each designated teacher teaches the lesson. Since there may be several groups, teaching will be concurrent in parts of the room, in separate rooms, or in halls. Designated teachers must arrange for or provide their own materials and equipment if any....

At the conclusion of the time permitted, the designated teachers take a few minutes to assess student achievement and satisfaction using evaluation techniques and/or instruments provided....

In step four reflection on the teaching occurs. Here teachers discuss openly with their peers what the teaching and learning processes were like for them. First the small groups discuss the lesson...

Following small group discussion the whole group is reassembled in order to discuss another set of questions. This reflective activity with the whole group encourages the discussion of alternative teaching methods. The leader...may focus attention on how each
lesson was planned, how each lesson was taught, and what happened that seemed to contribute to learning and satisfaction in each group. All participants have the opportunity to raise questions, describe events as they experienced them, and reflect on the teaching of which they were a part. (p. 553-554)

Despite numerous reports in the literature of successful implementation of reflective teaching (see, for example, Applegate, 1982; Armaline, 1985; Beeler, 1985; Holton, 1984; McKee, 1986; and Smith, 1984), very little empirical research has actually been conducted on this strategy for enhancing preservice teachers' reflectivity. The research that is available provides some support for the hypothesis that reflective teaching helps students grow in their ability to think and talk critically about teaching and learning (Cruickshank, Kennedy et al., 1981). Reflective teaching, its uses and benefits, and its research outcomes will be discussed more fully in the next section.
Reflective Teaching was conceptualized and developed at The Ohio State University by Donald R. Cruickshank and associates in an effort to provide students the opportunity to learn about teaching by teaching and by giving immediate and thoughtful consideration to that teaching. According to Cruickshank (1986a), preservice teachers need opportunities to stand back and consider the state of their own knowledge -- about content, learners, teaching -- and strategies they can employ to meet task demands. The assumption is that teachers who become more thoughtful about their teaching are more likely to become effective in their teaching -- that thoughtful consideration of one's teaching is prerequisite to improved classroom performance (Cruickshank, n.d.).

Reflective Teaching is thus a means to an end, the end being to engage preservice teachers in thoughtful, analytical consideration of a teaching act just experienced. Reflective teaching properly employed should make teachers more thoughtful and alert students of education who can see complex relationships among their personal characteristics and training, their learners' characteristics, the learning environment, the content to be taught and their teaching behaviors (Cruickshank, n.d.).
Dewey (1916) advised that the best way to develop good habits of thinking is to involve students in genuine experiences that stimulate active problem solving and reflection. For preservice teachers, according to Cruickshank (1987), such experiences should be those encountered by teachers in daily practice. The Reflective Teaching experience of planning, conducting, and evaluating instruction provides an opportunity for reflecting on such experiences.

While field experiences may also provide opportunities for reflection and growth, Reflective Teaching provides an environment in which students may feel more at liberty to experiment and make mistakes, to communicate their "private puzzles and insights" (Schoen, 1983, p. 333), and to subject their conflicts and dilemmas to productive public inquiry without fear of repercussions (Gore, 1987). The structure of most field experiences, given the authority relationships generally inherent to such programs, is unlikely to create such an environment. Reflective Teaching, on the other hand, provides a relatively non-threatening environment in which students can practice, experiment, and share teaching experiences.

Schoen (1983, 1987) discusses the importance of such practice experiences, or "virtual worlds" in the development of reflective practitioners. A virtual world, according to Schoen (1983), is "a constructed representation of the real
world of practice" (p.157). These representative worlds of practice seek to represent essential features of a practice to be learned while enabling students to experiment at low risk, vary the pace and focus of work, and go back to do things over when it seems useful to do so (Schoen, 1987). Virtual worlds are contexts for experiment within which practitioners can suspend or control some of the everyday impediments to rigorous reflection. Actions which might otherwise be irreversible can be examined for their meanings, revised, and tried again (Schoen, 1983).

The "virtual world" of Reflective Teaching helps students to confront a controlled reality until they attain adequate levels of skill and confidence. Then, when students do encounter the complexity of a regular classroom, they will have experienced a planned series of teaching acts in a minimally threatening environment with immediate feedback and supervision (Howsam, Corrigan, Denemark, & Nash, 1976). The case for such laboratory experiences in teacher preparation goes back at least to Dewey (1904), who called for laboratory experiences to occur prior to the apprenticeship in order to foster reflective criticism within students towards the nature of instruction, curriculum, and the purposes of education. He suggested that if students were placed in apprenticeship experiences too soon they would be overly influenced by the on-going practices found in their placements, and the result would be
mindless imitation (Goodman, 1986). By participating in Reflective Teaching before their field based experiences, students can be encouraged to approach teaching with an attitude of reflective criticism rather than mindless imitation.

**The Reflective Teaching Process**

During Reflective Teaching, a class of undergraduate education students is divided into groups of four to six. One student in each group is selected by the college instructor as the designated teacher. Each designated teacher is given the same Reflective Teaching Lesson (RTL) to teach the next time the class meets. Designated teachers are given the freedom to teach the RTL in any way they wish so long as they attempt to optimize learner achievement and satisfaction. After teaching the lesson (ten to fifteen minutes), the designated teacher assesses learner achievement and satisfaction using forms provided in the Reflective Teaching materials.

Following teaching and assessment, the teachers and learners participate in small group discussions, raising questions, discussing problems, and sharing ideas about the lesson they have just experienced. More specifically, the small groups discuss questions such as: "To what extent did the learners learn? To what extent were the learners satisfied? What do you think about teaching? About
learning? About yourself as a teacher or learner?” (Cruickshank, 1980, p. 23). One of the foremost goals is to get every designated teacher to consider why they are doing what they are doing and with what results (Cruickshank, n.d.).

After about ten minutes of small group interaction, the class reconvenes as a large group to discuss more general issues that lead to better understanding of the teaching/learning process. Because the groups have shared a teaching/learning experience, there is ample opportunity to consider important and perennial issues in teaching: planning, execution, evaluation, use of instructional materials, learner satisfaction, and the role of the teacher (Cruickshank, 1980). Since different teachers have taught the same objectives, a comparison can be made of different teaching methods and results. Specifically, the whole class can discuss questions such as: "How was the lesson taught in your group? What happened that you believe contributed to learning and satisfaction? What attitudes or beliefs about teaching and learning may have changed as a result of the RTL and the reflective sessions?" (Cruickshank, 1980, p. 24).

Together the small and large group discussions constitute the reflective phase — the most important part of Reflective Teaching. In the remaining time the
instructor makes additional observations and selects a new group of designated teachers for the next session.

Reflective Teaching Lessons

Over thirty RTLs have been developed and field tested as a part of the reflective teaching materials. An RTL is a set of materials which provides: a teaching objective; the information the designated teacher will need in order to meet the objective; and a way to assess the teaching for learner achievement and satisfaction (Cruickshank, 1980).

The content of the RTLs varies considerably and includes such activities as learning to make origami butterflies, constructing "magic squares," and learning principles of classroom management. RTLs, according to the developers, should meet four criteria: (1) they must be interesting to teach and learn about; (2) their content must be unique and not normally a part of academic subjects with which students would already be familiar; (3) they must be capable of being taught in ten or fifteen minutes; and (4) they must contain a measurement of learner achievement and satisfaction.

Most RTLs are referred to as content-free, that is, the content to be taught is not related to professional education curricula so that the focus is on teaching rather than the content (Cruickshank, 1980). However, several RTLs have been developed that are related to the content of professional education. Additionally, Reflective Teaching
Lessons are available for each of the domains of learning: cognitive, affective, and psychomotor. In this way, prospective teachers can gain experience analyzing all three domains.

**Benefits of Reflective Teaching**

Cruickshank (1980) reported the following benefits of Reflective Teaching to preservice teachers, teacher educators, teacher education institutions, and teacher education researchers:

**Benefits to preservice teachers.**

1. Satisfies their desire to have more teaching experience and to learn by teaching.

2. Provides significant professional and social interaction with fellow students.

**Benefits to the teacher educator.**

1. Provides an additional form of on-campus laboratory teaching.

2. Permits several preservice teachers to teach at once time thus increasing opportunity to teach.

3. Provides teaching opportunities through Reflective Teaching Lessons (RTLs) that are complete yet very brief thus conserving time.

4. Provides a common teaching experience. Even though several teachers and learners are engaged in separate small groups, they all are having a common experience that can be shared.

5. Provides an opportunity for preservice teachers to experience the complete act of teaching, i.e., planning, teaching, and evaluation.
6. Provides preservice teachers with opportunities to try out their own teaching style -- to be themselves, to teach as they wish.

7. Provides teachers with feedback or knowledge of results. They find out to what extent when they teach learners learn and are satisfied.

8. Provides opportunity to reflect on the many factors that can affect teaching and learning and to understand the complexity of teaching.

9. Provides opportunities for participants to pose and test hypotheses about teaching and learning. (What do they think matters most -- try it and see.)

10. Provides an opportunity through RTLS to experience up to seven teaching behaviors: demonstration, description, designation, explanation, fostering attitude change, simulation and problem solving.

11. Provides an opportunity through RTLS to experience bringing about learning in each domain of learning.

12. Provides an opportunity to teach a variety of content from that which is inherently interesting to that which requires significant motivation of the learner.

13. Provides teaching opportunity in a scaled-down, controlled, safe, supervised context -- the college classroom.

14. Requires no expensive equipment, extra personnel or special classroom.

15. Can be used to help preservice teachers explore teaching as a career and to explore self-as-teacher.

16. Provides an opportunity to do research on teaching in a laboratory setting. For example, one could look for correlates of teacher effectiveness such as clarity and enthusiasm or time-on-task.

Benefits to the teacher education institution.

1. All of the above.

2. Provides the least expensive form of laboratory teaching experience.
3. Could eliminate the need for so many off-campus teaching stations prior to student teaching.

4. Responds to National Coouncil for Accreditation in Teacher Education (NCATE) Standard 2.3.3 that calls for laboratory and clinical experience.

5. Responds to the AACTE Bicentennial Commission Report Educating a Profession that says the teacher education classroom should be a laboratory for the study and development of teaching knowledge and skills.

Benefits to teacher education researchers.

1. Provides a controllable, laboratory setting in which teaching and learning can be examined and experimented with.

2. Other benefits would likely accrue if Reflective Teaching was used for other than the ordinary purpose, i.e., to provide teaching experience, knowledge of results and opportunity for reflection on the act of teaching.

Uses and Modifications of Reflective Teaching

Reflective Teaching is used in preservice teacher education courses to introduce novices to the role of the teacher, to help them relate educational theory to teaching practice, and to help them develop critical, reflective attitudes toward teaching. Descriptions of the use of Reflective Teaching in preservice teacher education include articles by Beeler, Kayser, Matzner, and Saltmarsh (1985); Holton (1984); Langrehr (1982); McKee (1986); and Sullivan (1984). In addition to general teacher education, Reflective Teaching has also been used successfully in graduate teaching associate workshops (Armaline, 1985),
inservice teacher education (Applegate, 1982), agricultural education (Peters, 1980), and health education (Smith, 1984). Another suggested use is to employ Reflective Teaching in graduate education in administration and supervision -- preservice supervisors can practice clinical supervision, teacher evaluation, or a related supervisory task within the framework that Reflective Teaching provides (Cruickshank, 1985).

In addition to these descriptions of the use of Reflective Teaching in a variety of settings, the literature also contains several suggestions for modifications of Reflective Teaching. Beeler et al. (1985) have developed a new learner satisfaction form they use in place of the form published in the Reflective Teaching manual (see Appendix D). The authors contend that the original learner satisfaction form (see Appendix C) is presented in such a way that most learners will check "satisfied" or "very satisfied," either because they do not want to hurt their classmates, or because they are anticipating their own teaching and are hoping classmates will reciprocate with satisfactory feedback. The revised form asks the learner to circle a number from one to ten to represent overall level of satisfaction, from "exceptional" to "dissatisfied," allowing for a greater number of descriptors from which to choose.
McKee (1986) recommended four additional modifications to Reflective Teaching based upon her experience with Reflective Teaching in Australia at the Newcastle College of Advanced Education:

1. All lessons are videotaped, as also is the small-group feedback session at the conclusion of the lesson. Thus opportunity is provided for the designated teacher to review the complete experience, as well as to compare the teaching and learning outcomes of others who have been given the same task.

2. In addition to indicating their satisfaction with the lesson, learners rate their teacher on a "Peer Teaching Appraisal Guide" using ten criteria such as clarity, verbal fluency, enthusiasm, etc. This provides structured feedback which enables the designated teachers to identify their strengths and weaknesses as judged by their peers.

3. While reviewing their videotapes, the designated teachers complete a "Teaching Observation Schedule" which requires them to identify and comment on aspects of each phase of the lesson. This enables reflection on the skills of planning and presentation in the light of the learning outcomes.

4. A summary of the main discoveries about teaching and learning is distributed to all participants after each session. (p. 3)

Gore (1987) presents a critical analysis of the concept and use of Reflective Teaching, and presents two ideas for modifying the scheme that she contends would improve it. Her first recommendation is to change Reflective Teaching Lessons so that they are no longer content-free. Instead, Gore recommends that students determine the content of their own RTLs according to their own interests. Another possibility, according to Gore, would be to use subject
matter that relates to the school curriculum. In regard to this recommendation, it should be made clear that this alternative is already suggested in the Reflective Teaching materials (Cruickshank et al., 1980). While the developers of Reflective Teaching prefer content-free lessons, they also note that:

Since an RTL merely serves as a stimulus for reflection upon teaching, its content can be drawn from almost anywhere. The content can, if desired, be drawn from [the students'] majors...It is also possible to develop RTLs wherein the content can be the content of the education course in which students are enrolled. For example, if a general methods course includes attention to taxonomies of learning then an RTL can be developed with that as the content. (p. 68-69)

The second modification proposed by Gore is to expand the scope of reflection following the lessons to include discussion of such things as students' own assumptions and biases and how they affect their teaching, the students' own socialization into the role of teacher, the paradigms that circumscribe conventional thought about classroom practice, and the alternatives possible in dealing with specific educational issues or problems. In regard to this recommendation, it should be noted that this option, too, is already possible within the original framework of Reflective Teaching. Cruickshank (1980) notes that the reflective sessions can be very rich and diverse and proceed in a number of different directions, depending on the guidance of the college instructor. Armaline (1985) comments that the
RTL and the teaching episode can be discussed with regard to "issues of pedagogy, narrowly defined" (e.g., process-product notions); but that just as easily one can engage participants in "discussions of ethics in the classroom, curricular choice, and the relationship of schooling and the role of the teacher to cultural reproduction. The choice is that of the participants, especially the group instructor" (p. 13). An early study of Reflective Teaching conducted by Cruickshank and associates (1980) found that, as expected, the success of the large-group discussions was largely dependent upon the college instructor's ability and direction. It would seem, then, that the reflective discussions as originally structured can easily include consideration of those topics suggested by Gore (1987).

Research on Reflective Teaching

At the present time little research has been conducted on Reflective Teaching. The most comprehensive study conducted to date took place in the spring of 1979 and was supported through a research grant from the Exxon Education Foundation. Results of this study were reported by Cruickshank, Kennedy, Williams, Holton, and Fay (1981); Williams and Kennedy (1980), Nott and Williams (1980), and Holton and Nott (1980).

The subjects for the study were 101 male and female undergraduate students, juniors and seniors, enrolled in
four intact sections of a general methods class required of all secondary education majors at The Ohio State University. Conventional computer scheduling determined the assignment of students to sections. Most students had completed an early experience program during their freshman year and had completed a course in educational psychology prior to this methods course. Two of the intact sections were randomly selected as the experimental groups and the other two intact sections were randomly selected as the control groups. The experimental sections had 23 students and 32 students (n=55), and the control sections had 20 students and 26 students (n=46). Four instructors, graduate teaching assistants who had experience with Reflective Teaching, were randomly assigned to the four sections, replacing regular instructors during all experimental activities.

Six hours of Reflective Teaching took place during three two-hour class periods on three consecutive Thursdays. Two Reflective Teaching Lessons were taught during each two-hour session. Each student taught at least one Reflective Teaching Lesson and was a learner during the remaining lessons.

The two control sections were also divided into small groups of five or six students and received a packet of curriculum materials prepared for this study. The packet, entitled "Teaching: The Roots of Our Profession 1800-1918," contained copies of original documents relating to teaching
during the formative years of the profession in America. These materials were examined by control students within their small groups and subsequently served as the basis for small and large group discussion.

Several hypotheses were investigated to determine what outcomes occur when Reflective Teaching is used in a preservice methods class. The hypotheses investigated were:

1. As a result of engagement in Reflective Teaching, participants will identify a greater number and wider variety of variables present during the act of teaching (Nott & Williams, 1980, p. 2).

2. As a result of engaging in Reflective Teaching students will subsequently be better able to think and talk critically about teaching and learning (Holton & Nott, 1980, p. 2).

3. As a result of engagement in Reflective Teaching, participants will:
   a) manifest a more positive and confident disposition towards their undergraduate course-related preparation.
   b) manifest a more positive and confident disposition toward real-world teaching experience that they are scheduled to participate in the near future, i.e., short course and student teaching.
   c) manifest a more positive and realistic view of themselves as teachers.
   d) manifest a more realistic view of the role and demands of teaching. (Williams & Kennedy, 1980, p. 2)

4. As a result of engagement in Reflective Teaching, participants will report behavioral changes similar to those reported by former participants (Williams & Kennedy, 1980, p. 3).

Each of these hypotheses was tested by the use of pretest and posttest instruments administered to both the
experimental and control groups at the beginning and conclusion of the study.

Using the previously described design, Nott and Williams (1980) investigated the hypothesis that, "as a result of engagement in Reflective Teaching, participants will identify a greater number and wider variety of variables present during the act of teaching" (p. 2). To test this hypothesis experimental and control subjects viewed a videotape of a teaching episode. The videotape portrayed a male junior high school teacher instructing fifteen seventh graders on the topic of the Kachuan Language (a Reflective Teaching Lesson). The primary focus of the videotape was on the teacher's activity. For the pretest, subjects viewed the first 12 minutes of the teaching episode, after which they responded to the "I Saw and Believe to be Important" instrument. The instrument required the subjects to make statements about what they saw that might have contributed to or detracted from teaching and learning. Beside each of the statements the subjects were also asked to state why or in what way they believed it contributed to or detracted from teaching and learning. A written transcript of the videotape was provided to help students recall the teaching episode. The posttest videotape was a continuation of the same teaching episode. Subjects were given the same instrument and directions as
with the pretest as well as a written transcript of the tape.

Responses were examined using content analysis to obtain three separate scores: Number of Variables, Variety of Variables, and Kinds of Reasons. The Number of Variables score was obtained by counting the number of different statements in the "I Saw and Believe to be Important" column. The Variety of Variables score was obtained from the same data, but looked at the variety of variables named by participants. The third score, Kind of Reason, was derived by examining the second part of the instrument which asked participants to explain why the observed factors were important. These responses were rated from zero (no response) to three (a higher order reason).

Analysis of the data revealed that the Number of Variables and Variety of Variables scores did not support the hypothesis. The Kind of Reason score did appear to show a difference in change scores between control and experimental groups, with an increase for the Reflective Teaching participants and a decrease for the control group. Although statistical support was lacking for the hypothesis that Reflective Teaching participants would identify a greater number and wider variety of variables, a questionnaire revealed that 80% of the Reflective Teaching participants believed that they were better able to do so after participation in the experiment.
Nott and Williams (1980) presented several possible reasons why statistical support for the hypothesis was not obtained:

1. Reflective Teaching, although it may do many things, may not increase a student's ability to name a greater number and wider variety of variables that affect teaching and learning.

2. There was no way to ensure that Reflective Teaching subjects in their small groups really attended to specific questions that were supposed to focus on identifying criterion variables.

3. During large group discussions, students were asked to respond to the question: "What were the factors that contributed to or detracted from learner achievement and satisfaction?" However, this was only one question from a larger set and therefore possibly not enough time and emphasis was placed on this question to provide significant difference.

4. Although students were asked to identify variables, at no time were they asked to name variables in a wide variety of categories, nor were they given a framework for thinking about variables in terms of types.

5. Possibly the test of the hypothesis was not adequate, since a videotape may not be a valid instrument for measuring students' ability to identify variables.

6. Because the videotape focused mainly on the teacher, it is possible that the students believed they were to think of what was important only in terms of teacher behaviors, which would reduce the variety of variables they might have named.

7. Treatment of only six Reflective Teaching Lessons may not be a strong enough treatment to increase a student's ability to see a greater number and wider variety of variables. If students did Reflective Teaching longer, possibly a change would occur.

8. It is possible that the two videotapes used were not similar enough in richness of variables to provide a reliable pre-post comparison.
9. It is possible that students did not take the test seriously since they were observed to be less interested in the posttest than the pretest. Also the test for this hypothesis was the last test given.

10. Possibly treatment was confounded by content from the rest of the course, such as microteaching. (p. 11-12)

Using the same design and sample, Holton and Nott (1980) investigated the hypothesis that, "as a result of engagement in Reflective Teaching students will subsequently be better able to talk critically about teaching and learning" (p. 2). The pre- and posttest instruments used to test the hypothesis consisted of two sentence stems: "When I think about teaching..." and "When I think about learning..." Subjects were asked to complete each sentence and to add three more sentences in a two-minute period.

Subjects' written responses were categorized on the basis of grammatical structure: declarative, evidential, analytical, or indeterminate. Statistical analysis of the data indicated that students who participated in Reflective Teaching produced proportionately fewer (p<.01) evidential statements on the posttest than did members of the control group, and provided proportionately more analytical statements (p<.10). The latter effect fell short of being significant at the .05 level, therefore providing only partial support for the hypothesis (Cruickshank, Kennedy, Williams, Holton, & Fay, 1981).
Williams and Kennedy (1980) using the previously described design and sample investigated the following hypotheses:

1. As a result of engagement in Reflective Teaching, participants will:
   a) manifest a more positive and confident disposition towards their undergraduate course-related preparation.
   b) manifest a more positive and confident disposition toward real-world teaching experience that they are scheduled to participate in the near future, i.e., short course and student teaching.
   c) manifest a more positive and realistic view of themselves as teachers.
   d) manifest a more realistic view of the role and demands of teaching.

2. As a result of engagement in Reflective Teaching, participants will report behavioral changes similar to those reported by former participants (Williams & Kennedy, 1980, p. 2-3).

To test these hypotheses, five attitude instruments were developed and administered: "Attitudes Toward Teaching," "Beliefs About Teaching," "Me as a Teacher," "Practice Teaching," and "Education: F&R 435." Due to the large number of items contained in all the instruments, each instrument was subjected to a classical factor analysis to identify clusters of items measuring the same dimensions or factors. Pretest and posttest results for each instrument were subjected to a separate factor analysis.

The "Attitudes Toward Teaching" instrument was used to measure hypothesis 1-d. The instrument consisted of a six point Likert scale containing 21 attitude statements like
the following: "An effective teacher should use a variety of ways to accomplish the same task" and "Teaching is a demanding activity." Analysis of the data collected on this instrument did not support the hypothesis that as a result of engagement in Reflective Teaching participants will manifest a more realistic view of the role and demands of teaching.

The "Beliefs About Teaching" instrument was used to measure the second hypothesis: "As a result of engagement in Reflective Teaching, participants will report behavioral changes similar to those reported by former participants." Statistical analysis of the data collected by this instrument did not support the second hypothesis.

The "Me as a Teacher" instrument was used to measure hypothesis 1-c: "As a result of engagement in Reflective Teaching participants will manifest a more positive and realistic view of themselves as teachers." The pretest-posttest instrument contained 15 bipolar adjectives on a six-point semantic differential scale. Statistical analysis of the data collected by this instrument found no significant differences between the experimental and control groups and therefore did not support the hypothesis.

The "Practice Teaching" instrument was used to measure Hypothesis 1-b: "As a result of engagement in Reflective Teaching participants will manifest a more positive and confident disposition toward real-world teaching experience
that they are scheduled to participate in the near future, i.e., short course and student teaching." This instrument contained ten bipolar adjectives on a six-point semantic differential scale and was administered both as a pretest and a posttest. Analysis of the data collected by this instrument revealed a significant difference between the the experimental group and the control group. Reflective Teaching participants indicated they were less anxious about student teaching than students who did not experience Reflective Teaching (p<.05).

The "Education: F&R 435" instrument was used to measure hypothesis 1-a: "As a result of engagement in Reflective Teaching participants will manifest a more positive disposition towards their undergraduate course-related preparation." This instrument contained 14 bipolar adjectives on a six-point differential scale, and was administered only as a posttest. Analysis of the data collected by this instrument revealed no significant differences between the control group and the experimental group in attitudes toward Education: F&R 435.

In summary, this first major study of Reflective Teaching gave partial support to the hypothesis that participation in Reflective Teaching promotes students' ability to think and express themselves in a complex manner. Additionally, students who participated in Reflective Teaching were relatively less anxious about their future
student teaching assignments. Although not supported by this study, the researchers contend that the second expectation -- that students experiencing Reflective Teaching will identify a greater number and wider variety of variables -- is still viable and merits further investigation (Cruickshank et al., 1981).

Peters (1980) compared Reflective Teaching with microteaching in regard to students' (1) views of themselves as teachers, (2) attitudes toward teaching, (3) perceptions of the role of teaching, and (4) attitudes toward their laboratory teaching experience. The sample for this study consisted of two intact sections of undergraduates enrolled in an introductory agricultural education course at The Ohio State University. One section was randomly assigned Reflective Teaching while the other section served as a control group and received microteaching (Peters, 1985). The experiment was conducted Autumn Quarter, 1979, and repeated Winter Quarter, 1980.

The analysis of data for both Autumn Quarter, 1979, and Winter Quarter, 1980, indicated there were no significant differences between posttest scores of students who participated in reflective teaching and those who participated in microteaching on their attitudes toward teaching, their perceptions of the role of teaching, and their attitudes toward the type of laboratory teaching experience engaged in (microteaching or Reflective Teaching)
(Peters, 1985). The data did, however, indicate that the Autumn Quarter Reflective Teaching group scored significantly higher than the microteaching group on the posttest measuring their views of themselves as teachers.

Peters and Moore (1981) conducted a similar study comparing the effects of microteaching and Reflective Teaching in a teacher education methods course on the following dependent variables: (1) students' views of themselves as teachers, (2) students' attitudes toward teaching, (3) students' perceptions of the role of teaching, (4) students' attitudes toward the type of laboratory teaching experience engaged in (microteaching or Reflective Teaching), and (5) students' teaching performance as measured by their student teaching grade (Peters, 1985). Analysis of the data revealed there were no significant differences on any of the variables according to the type of teaching experience engaged in.

In summary, the available research on Reflective Teaching reveals only very limited outcomes for participation in Reflective Teaching. However, these results may have been due in part to limitations beyond the control of the researchers. The study reported by Cruickshank, et al. (1981), for example, was conducted in a context "not altogether favorable for a successful implementation of the Reflective Teaching treatment" (p. 31). To accommodate the videotaping of selected sessions,
Reflective Teaching groups met in a facility far removed from the heart of the campus. This inconvenience for students combined with a noticeable lack of enthusiasm for educational experimentation on the part of several instructional personnel associated with the methods course -- but not directly affiliated with the project -- may have had a negative effect on the study (Cruickshank et al., 1931). Based on these problems as well as the paucity of research on Reflective Teaching, it seems evident that additional research on Reflective Teaching is needed if its use is to be grounded in a firm base of empirical support.

Summary

Two general conclusions emerge rather prominently from this review of the literature on preparing reflective teachers. First, there is a clear consensus that teacher education programs should prepare teachers who are reflective about their work. The view of teaching as an ongoing inquiry with a commitment to study and learn from one's own practice has had advocates throughout the history of teacher education, and in recent years has gained increasing support in teacher education circles. Teachers must be prepared for self-directed growth through reflective inquiry. They should inquire into classroom behavior and situations, analyze what has happened in relation to what
could happen, reflect on the origins, purposes, and consequences of their actions, and be cognizant of their own assumptions and biases.

The second overwhelming conclusion from this literature review is that, pedagogically, few of the answers are in. This is especially true as it relates to the overarching question: How do we prepare teachers who are reflective about their work? Virtually no evidence was uncovered supporting the effectiveness of instruction in reflective thinking. Many teacher educators believe that teachers can indeed be taught to be more reflective. But empirically, we have been unable to document strong support for such beliefs. While the literature does contain self reports and isolated examples of success, few of these programs have been the focus of empirical research. In reality, the question of how best to prepare reflective teachers has received little attention from researchers. We do not yet know what types of teacher education programs will enhance teachers' reflectivity. We do not know the impact of specific instructional strategies on preservice teachers' ability and propensity to reflect on teaching. We do not know whether any growth resulting from such programs and strategies will transfer to later classroom practice.

In summary, what is needed is systematic research into the ways in which preservice teachers are affected by their participation in programs and activities designed to develop
reflective teachers. This study is an effort to determine the impact of two such programs, Reflective Teaching and Reflective Teaching supplemented with a theoretical component, on preservice teachers' reflectivity in analyzing classroom teaching situations.
CHAPTER III

METHODOLOGY

This chapter provides a description of the methodology employed to achieve the objectives of this study. First a brief overview of the primary purposes of the study and the context in which it was conducted is given. Next, the research procedures are discussed under six major sections: (1) sample, (2) research design, (3) experimental treatments, (4) instrumentation, (5) data collection procedures, and (6) data analysis procedures.

Overview

The primary objectives of this study were: (1) to determine the effects of participation in Reflective Teaching on preservice teachers' ability to reflect on classroom teaching situations, and (2) to determine the effects of supplementing the Reflective Teaching regimen with a conceptual/theoretical component on reflective thinking. Specifically, the research questions posed in this study were: (1) Does participation in Reflective Teaching enhance preservice teachers' ability to reflect on classroom teaching situations they observe? (2) Does supplementing the Reflective Teaching regimen with a conceptual/theoretical component enhance participants'
reflectivity to a greater extent than does Reflective Teaching as originally designed?

To answer these questions, a quasi-experimental study was conducted. Seven sections of Education 450, an undergraduate teacher education course at The Ohio State University were randomly assigned to one of three treatment levels: (1) Reflective Teaching, (2) augmented Reflective Teaching, and (3) the control group. Half of the subjects were pretested and all the subjects were posttested. Comparisons were made between the groups in order to draw inferences about the effects of the treatments. Procedures employed in conducting the study are described in detail in the following sections.

Sample

The experimentally accessible population for this study consisted of students at The Ohio State University who enrolled in the seven sections of Education 450, Professional Introduction to Education, during the Spring Quarter, 1988. This same group also comprised the sample. Because subjects were not randomly selected from some larger population, the results of this study cannot be generalized beyond the subjects participating in this study. However, to the extent that students in this study are similar to other undergraduates in similar teacher education programs, the results of the study may also be applicable to such
groups. A detailed description of the subjects participating in this study follows. Determining the similarity between subjects in this study and the larger population of undergraduate teacher education students is not within the scope of this study. However, teacher educators interested in applying the outcomes of this study in their own programs can compare their students with those in this study to determine whether there is sufficient similarity between the groups to warrant the application of this study's findings to their programs.

One hundred and seventeen students were enrolled in Education 450 at The Ohio State University during the Spring Quarter, 1988. For the purposes of this study, the seven groups were randomly assigned to three levels or treatment conditions. Two groups were randomly assigned to level one, participation in Reflective Teaching. Two groups were randomly assigned to level two, participation in augmented Reflective Teaching. Three groups were randomly assigned to level three, the control group. Within each of the first two treatment levels, one group was randomly assigned to be pretested. Within the control group level, two groups were randomly assigned to be pretested.

Of the 117 students enrolled in Education 450 during the course of this study, 112 participated throughout the study. Five students were dropped from the study because of absenteeism on one or more days. The actual number of
students participating throughout the study at each level of the treatment condition were: level one, 38; level two, 29; and level three, 45. Table 1 provides the number of students participating in each group and at each level.

Table 1

Number of Students by Treatment Group and Pretest/No Pretest Condition

<table>
<thead>
<tr>
<th></th>
<th>Pretest</th>
<th>No Pretest</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEVEL 1: Reflective Teaching</td>
<td>15</td>
<td>23</td>
<td>38</td>
</tr>
<tr>
<td>LEVEL 2: Augmented Reflective Teaching</td>
<td>17</td>
<td>12</td>
<td>29</td>
</tr>
<tr>
<td>LEVEL 3: Control Group</td>
<td>10</td>
<td>15</td>
<td>45</td>
</tr>
</tbody>
</table>

Total 57 55 N=112

Because intact classes were used; i.e., subjects were not randomly assigned to groups, the composition of each group was analyzed to determine whether there were large differences between the groups in terms of subjects' academic rank, sex, and college major. Class rosters were examined to obtain this information.
Class rank. Approximately one-fifth of the subjects were sophomores, nearly one-half were juniors, nearly one-fourth were seniors, and the remaining eight were students who had already completed the bachelor's degree. As shown in Table 2, most of the treatment groups consisted of a fairly similar distribution of class rankings. Most of the students in each class were juniors, with some seniors and sophomores and very few post-baccalaureate students. In general, the post-baccalaureate students in this course were students with bachelor's degrees in some other field, returning to obtain certification as teachers.

Simply because of their class rank, it can be assumed that seniors would have the greatest knowledge and experience related to classroom teaching, especially in comparison to sophomores just entering the teacher education program. This greater knowledge and experience would certainly be an asset in reflecting on and analyzing classroom teaching situations. Therefore, students with upper class ranks would seem to have an advantage over less experienced students in terms of their scores on the outcome measures of this study. However, no a priori information was available to substantiate this notion. Nevertheless, the higher percentage of seniors in the control group must be considered when interpreting the outcomes of the study.
### Table 2
Composition of Treatment Groups
by Class Rank of Subjects

<table>
<thead>
<tr>
<th></th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
<th>Post-Baccalaureate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEVEL 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reflective Teaching</td>
<td>11</td>
<td>20</td>
<td>5</td>
<td>2</td>
<td>38</td>
</tr>
<tr>
<td>LEVEL 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Augmented Reflective Teaching</td>
<td>3</td>
<td>16</td>
<td>8</td>
<td>2</td>
<td>29</td>
</tr>
<tr>
<td>LEVEL 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Group</td>
<td>9</td>
<td>18</td>
<td>14</td>
<td>4</td>
<td>45</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>23</td>
<td>54</td>
<td>27</td>
<td>8</td>
<td>N=112</td>
</tr>
</tbody>
</table>

**Sex.** Forty-five males and 67 females were included in the total sample. In percentages, the total sample consisted of 40.2% males and 59.8% females. Table 3 provides the composition of each treatment level in terms of the sex of the subjects.

As shown in Table 3, the composition of treatment groups at levels one and three closely resembled the composition of the total sample: 52.6% males and 47.4% females for level one, and 42.2% males and 57.8% females for level three. Level two showed the largest difference in comparison to the composition of the total sample: 20.7%
males and 79.3% females. There were no a priori grounds for assuming that one gender is superior to another in ability to reflect on and analyze classroom teaching situations. However, this difference between treatment groups in terms of sex of subjects must be kept in mind when interpreting the results of the study.

Table 3
Composition of Treatment Groups by Sex of Subjects

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LEVEL 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reflective Teaching</td>
<td>20</td>
<td>18</td>
<td>38</td>
</tr>
<tr>
<td><strong>LEVEL 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Augmented Reflective Teaching</td>
<td>6</td>
<td>23</td>
<td>29</td>
</tr>
<tr>
<td><strong>LEVEL 3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Group</td>
<td>19</td>
<td>26</td>
<td>45</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>67</td>
<td>45</td>
<td>N=112</td>
</tr>
</tbody>
</table>
College major. The sample of students participating in this study included a wide range of college majors. The college majors with the largest numbers of students were elementary education, with 24.1%; English education, with 19.6%; and social studies education, with 13.4%. Table 4 provides the composition of each treatment group in terms of the college major of the students.

The percentage of elementary education majors at all three levels was similar to the percentage of elementary education majors for the total sample: level one, 21.1%; level two 20.7%; and level three 28.9%. Additionally, the percentage of English education majors at all three levels was similar to the percentage of English education majors for the total sample: level one, 15.8%; level two, 17.2%; and level three, 20%. For social studies majors, however, there were larger differences between the treatment groups: level one, 10.5%; level two, 24.1%; and level three, 13.4%. Again, there were no a priori grounds for assuming that students in any given college major were superior to other students in terms of ability to reflect on and analyze classroom teaching situations.
<table>
<thead>
<tr>
<th>Professional Area</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary Education</td>
<td>8</td>
<td>6</td>
<td>13</td>
<td>27</td>
</tr>
<tr>
<td>English Education</td>
<td>6</td>
<td>5</td>
<td>9</td>
<td>20</td>
</tr>
<tr>
<td>Social Studies Education</td>
<td>4</td>
<td>7</td>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td>Art Education</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Agricultural Education</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Industrial Technology</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Health Education</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>French Education</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Continuing Education</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Business Education</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Dance</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Art</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Speech/Theater</td>
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</tr>
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<td>Humanities</td>
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<td>1</td>
</tr>
<tr>
<td>Russian</td>
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</tr>
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| Total                                 | 38      | 29      | 45      | N=112  |
Research Design

The primary purpose of this study was to examine the effects of Reflective Teaching on preservice teachers' ability to reflect on and analyze classroom teaching situations. Additionally, this study explored the effects of supplementing Reflective Teaching with theoretical knowledge about reflection. The research design selected to fulfill these purposes was an extension of the Solomon Four-Group Design (Campbell & Stanley, 1966). The Solomon Four-Group Design is illustrated by Campbell and Stanley (1966, p. 24) as follows:

\[
\begin{array}{ccccc}
R & O_1 & X & O_2 \\
R & O_3 & O_4 \\
R & X & O_5 \\
R & O_6 \\
\end{array}
\]

R represents random assignment of subjects to treatment conditions; X represents the experimental treatment and 0 represents the observed variables (pretests and posttests). In the Solomon Four-Group Design, two groups participate in the experimental treatment and two groups serve as the control group. One experimental group is pretested, and one is not. One control group is pretested, and one is not. By using this design, both the main effects of testing and the
interaction of testing and the experimental condition are determinable (Campbell & Stanley, 1966). Furthermore, the effect of X is replicated in four different fashions: 

\[ 0_2 > 0_1, \ 0_4 > 0_3, \ 0_5 > 0_3, \] 

and \[ 0_5 > 0_6. \] The actual instabilities of experimentation are such that if these comparisons are in agreement, the strength of the inference is greatly increased (Campbell & Stanley, 1966).

Several modifications of the Solomon Four-Group Design were made for the purposes of this study. First, since random assignment of subjects to treatment groups was not feasible, intact classes were used. As a result, this study was a quasi-experimental study rather than a true experiment. Second, the design was extended to include seven groups rather than four. This extension permitted the researcher to examine the effects of two different experimental treatments, and it made use of all available subjects. The extended design utilized in this study is illustrated diagrammatically below:

\[
\begin{array}{cccc}
G & 0_1 & X_1 & 0_2 \\
G & 0_3 & X_1 & 0_3 \\
G & 0_4 & X_2 & 0_5 \\
G & 0_6 & X_2 & 0_6 \\
G & 0_7 & 0_8 & 0_9 \\
G & 0_{10} & 0_{11} &
\end{array}
\]
The symbols are defined as follows:

- G represents intact groups with no random assignment of subjects to groups.

- X₁ represents the exposure of a treatment group to level one of the experimental variable, Reflective Teaching.

- X₂ represents the exposure of a treatment group to level two of the experimental variable, augmented Reflective Teaching.

- O represents measurements on subjects. O₁, O₄, O₇, and O₉ represent a pretest designed to measure students' reflectivity in analyzing classroom teaching situations. O₂, O₃, O₅, O₆, O₈, O₁₀, and O₁₁ represent two posttests designed to measure: (1) students' reflectivity in analyzing classroom teaching situations, and (2) students' theoretical knowledge about reflective thinking.

Campbell and Stanley (1966) list eight possible threats to the internal validity of quasi-experimental research: history, maturation, testing, instrumentation, regression, selection, mortality, and interaction of selection and maturation. Campbell and Stanley (1966) also list four possible threats to the external validity of quasi-experimental designs: interaction of testing and
treatment, interaction of selection and treatment, reactive arrangements, and multiple treatment interference. An analysis of each of these threats to internal and external validity and an explanation of how each was minimized in this investigation follow.

The use of a control group in this design minimized several of the threats to internal validity; namely, history, maturation, and instrumentation. History refers to the occurrence of an event which is not part of the experimental treatment but which may affect performance on the dependent variable. Maturation refers to changes that may occur within subjects over a period of time and which may affect their performance on the measure of the dependent variable. Instrumentation as a threat to internal validity refers to unreliability or lack of consistency in measuring instruments or changes in observers or scorers which may produce changes in the obtained measurements. In this study, the threats of history, maturation, and instrumentation were minimized through the use of a control group since the effects of these threats, if any, should be manifested equally in both the experimental and control groups.

The threats of testing and pretest-treatment interaction were controlled for in this study by pretesting only half of the treatment groups. Testing as a threat to internal validity refers to improved scores on a posttest
resulting from subjects having taken a pretest (Gay, 1981). In other words, taking a pretest may improve performance on a posttest, regardless of whether there is any treatment or instruction in between. Pretest-treatment interaction, on the other hand, is a threat to external validity. It occurs when a pretest increases or decreases a subject's sensitivity or responsiveness to the experimental variable, thus making the results obtained for the pretested population unrepresentative of the effects of the experimental variable for an unpretested population. In other words, the findings of the study would not be generalizable to unpretested populations. By pretesting only one-half of the subjects, as in the design of this study, any such interactions or effects become evident in the data analysis, and thus can be taken into account when reporting the results of the study.

Regression is a threat to internal validity primarily when groups have been selected on the basis of their extreme scores (Campbell & Stanley, 1966). Random assignment of subjects to groups is typically utilized to control for this threat to internal validity. In this investigation such random assignment was not possible. However, regression should not be a threat to this study's internal validity since the groups were not formed on the basis of extreme scores.
Differential selection of subjects may be a threat to the internal validity of this study since intact groups of students were used. To determine the extent of differences between the groups, the composition of each group was analyzed in terms of college major, sex, and class rank (see Tables 2, 3, and 4). Additionally, a one-way multivariate analysis of variance (MANOVA) was computed using the pretest scores of those subjects who were pretested (see Chapter 4). No significant differences were found between the three treatment levels on pretest scores. Given this outcome, differential selection of subjects appears not to be a significant threat to the internal validity of this study.

Mortality as a threat to internal validity refers to the differential loss of subjects from comparison groups. In this study, loss of subjects during the course of the study was minimal since all experimental activities occurred during regularly scheduled class time and since the instructors all had mandatory attendance policies. Only five of the original 117 subjects were dropped from the study due to absenteeism on one or more days. Three of the five subjects were dropped from the first treatment level, Reflective Teaching, and two were dropped from the second level, augmented Reflective Teaching. No subjects were dropped from the control groups. An analysis of the characteristics of the subjects dropped from the study revealed that they did not differ in any systematic way from
the other subjects. Two of the five subjects were female, and three were male. Two were seniors, two were juniors, and one was a sophomore. Their academic majors were elementary education, dance, English education, agricultural education, and art education. Pretest scores were available for four of the five subjects dropped from the study. The pretest scores for all four of these subjects were well within one standard deviation from the mean score for all subjects. It would appear, then, that subjects dropped from the study did not differ in any systematic or significant way from other subjects participating in the study; therefore, mortality was not a substantial threat to the internal validity of the study.

Multiple treatment interference may occur when multiple treatments are applied to the same groups of subjects, because the effects of prior treatments are not usually erasable. This interference is not a viable threat to the external validity of this study, however, since each subject participated in only one level of the independent variable.

Reactive arrangements, another possible threat to the external validity of this type of study, may occur when the experimental setting is novel or artificial or when the subjects know that they are participating in an experiment (Campbell & Stanley, 1966). This threat was controlled by conducting the research within an ordinary classroom setting. Students were not informed that they were
participating in a study. The instructors were asked to present the treatment conditions, pretests, and posttests as regular classroom events. In this way, the experiences of the students throughout the study were nondisruptive and similar to typical class activities.

Experimental Treatments

At the beginning of the study, the seven sections of Education 450 were randomly assigned to one of three treatment conditions: (1) Reflective Teaching, (2) augmented Reflective Teaching, and (3) the control group. Two sections were randomly assigned to each of the first two levels, and three sections were randomly assigned to the control group level. Within both level one and level two, one section was randomly assigned to take the pretest and one section did not take the pretest. Within level three, the control group, two sections were randomly assigned to take the pretest, and one did not take the pretest.

The Education 450 class schedule for all sections of the course consisted of three class meetings per week, on Mondays, Tuesdays, and Wednesdays. Each class session lasted three hours. All treatment conditions were administered within this regularly scheduled time frame. The three levels of the major independent variable are described more fully below.
Level 1: Reflective Teaching. The two treatment groups assigned to this level of the independent variable participated in Reflective Teaching on three consecutive days for two hours per day. This time frame for Reflective Teaching was selected for several reasons. First, and most importantly, six hours is the amount of in-class time typically reserved for Reflective Teaching in the Education 450 course at The Ohio State University. Thus, this study examined the effects of Reflective Teaching as typically utilized in this introductory education course. Secondly, while course instructors were happy to participate in the study as described herein, they were reluctant to devote more than the usual six hours of in-class time to Reflective Teaching because of competing course demands.

Course instructors conducted the Reflective Teaching sessions, treating them as a normal part of the regularly scheduled class activities. A description of the course instructors' training and qualifications for conducting these sessions is presented in a later section of this chapter. The large and small group discussions for each Reflective Teaching session were audiotaped in order to monitor the sessions and to ensure uniformity in following the Reflective Teaching regimen.

One week before the Reflective Teaching sessions were conducted, the course instructors explained the Reflective
Teaching process to the students and assigned one Reflective Teaching lesson to each student.

Six Reflective Teaching lessons had previously been selected for use in this study by the researcher with input from a variety of sources. The six lessons were selected in the following manner. An earlier study conducted by Williams and Hough (1980) included a field test of all available Reflective Teaching lessons. Based on the results of this field test, Williams and Hough (1980) selected six lessons that were successful in stimulating discussion and reflection, and that included a variety of teaching skills, teacher concerns, and learning requirements. In addition to the six lessons selected by Williams and Hough (1980), this researcher also selected six lessons that had worked especially well in stimulating reflection and discussion in previous teacher education courses taught by the researcher. Three of the Reflective Teaching lessons selected to this point appeared on both lists, yielding a total of nine lessons for potential use in this study. The researcher then contacted each instructor who had agreed to participate in the study, as well as several other graduate teaching associates familiar with Reflective Teaching, and discussed the Reflective Teaching lessons. From these discussions, the researcher selected six Reflective Teaching lessons that all the instructors agreed were especially conducive to reflection and discussion when implemented with preservice
teachers. The six selected lessons were: The John Dewey Task, The Origami Task, The Good Teacher Task, The Magic Squares Task, The Discipline in Elementary Classrooms Task, and The Vocabulary Task (see Appendix A).

Each Reflective Teaching lesson (Cruickshank et al., 1980) included: a description of the Reflective Teaching task, an introduction to the lesson, the objective(s) of the lesson, a list of necessary materials, a list of special conditions and limitations, the lesson content, directions for ending the lesson, a learner achievement test, an answer key, and a scoring box (see Appendix A).

On the day the lessons were distributed to the students, the instructors also explained the students' roles as designated teachers. The students were advised that they were free to use any teaching method they considered best in order to attain the lesson's specified objectives, and that their teaching time would be limited to fifteen minutes. At that time, the course instructors also described the role of the learners, the small group reflection session, and the large group reflection session.

On Monday, Tuesday, and Wednesday of the following week, six Reflective Teaching sessions were conducted. On Monday, the Good Teacher Task and the Magic Squares Task were taught; on Tuesday, the John Dewey Task and the Origami Task; and on Wednesday, the Discipline in Elementary Classrooms Task and the Vocabulary Task. Each student
served as a designated teacher for one session and as a learner for the remaining five lessons.

Each Reflective Teaching session was conducted as follows. At the beginning of each session, each class was divided into groups of four to six students. The designated teachers presented their lessons within the fifteen minutes allotted for the lesson itself, and then assessed learner achievement and satisfaction using tests and learner satisfaction forms provided by the course instructor. Following teaching and assessment, the designated teachers led their small groups in discussions, reflecting on the methods, goals, and outcomes of the lessons they taught. A list of small group discussion questions provided with the Reflective Teaching materials (Cruickshank et al., 1980) was given to each designated teacher to facilitate the discussion (see Appendix B). After about ten minutes of small group interaction, each class reconvened as a large group to compare and contrast the methods, reactions, and outcomes of the small group teaching sessions. During this discussion, the course instructors led the students to consider a variety of issues in teaching: planning, execution, evaluation, use of instructional materials, learner satisfaction, and the role of the teacher. A list of large group discussion questions provided with the Reflective Teaching materials (Cruickshank et al., 1980) was utilized by the course instructors to facilitate the large
group discussions. At the end of each session, course instructors summarized key points from the large and small group discussions, collected materials, and reminded the designated teachers for the next session about their upcoming lessons.

By the conclusion of the third day of Reflective Teaching, each student in the level one treatment condition had (1) planned, executed, and evaluated one fifteen-minute small-group peer teaching lesson; (2) assessed their learners' achievement and satisfaction upon completion of the lesson; (3) led one ten-minute small-group discussion analyzing and reflecting on their own teaching; (4) participated as learners in five Reflective Teaching lessons; (5) participated in five small group discussions analyzing and reflecting on their observations of others' teaching; (6) participated in six large group discussions analyzing and reflecting on their own teaching, their observations of other teachers, and perennial issues in teaching; and (7) rated five peer teachers using the Learner Satisfaction Forms (see Appendix D).

**Level 2: Augmented Reflective Teaching.** Groups assigned to this treatment level participated in both Reflective Teaching and a one and one-half hour session on conceptual/theoretical knowledge about reflective thinking.

Prior to participation in Reflective Teaching, subjects participated in a session focusing on theoretical knowledge
about reflective thinking in general and reflective teaching specifically. This theoretical session included lecture, discussion, and a small group activity. In order to ensure that both groups received exactly the same presentation, the sessions for both groups were conducted by the researcher. Instructors for these two groups introduced the researcher as a guest lecturer, and treated the session as a normal part of the regular class activities.

Objectives of the theoretical session were: Students will be able to (1) define and discuss reflective thinking; (2) identify instances of reflective thinking in their own lives; (3) diagram a model of the role of reflection in the learning process; (4) list three cognitive processes involved in reflection; (5) discuss three outcomes or benefits of reflective thinking; (6) provide a rationale for the need for teachers to be reflective about their work; (7) list and explain Van Manen's (1977) three levels of reflectivity; and (8) apply Van Manen's (1977) levels of reflectivity in analyzing classroom teaching situations (see Appendix E).

The first forty-five minutes of the session were spent in a lecture presentation format. The content of the lecture included: (1) general descriptions and definitions of reflection; (2) the role of reflection in the learning process, including a model by Kolb and Fry (1975); (3) cognitive processes involved in reflection; (4) outcomes of
reflective thinking; (5) reasons why teachers need to be reflective about their work; (6) John Dewey's (1933) philosophy on teachers as "students of teaching;" (7) Cruickshank's (1985) model of reflective thinking as applied to classroom situations; and (8) Van Manen's (1977) levels of reflectivity associated with classroom teaching. (See Appendix E for a complete outline of the content of the lecture, overhead transparencies used in the lecture, and student handouts distributed after the lecture.) This theoretical content was selected from the literature reviewed in Chapter II of this dissertation. Content was selected to provide subjects with an overall conceptual understanding of the process of reflection as well as concrete knowledge about specific points to consider when reflecting on classroom teaching situations. The activities described below were selected by the same criteria: they must provide an overall theoretical understanding of the process of reflection as well as practice in specific procedures related to reflecting on classroom teaching situations.

The next twenty minutes were spent discussing the lecture, relating its content to the students' own experiences, and answering any questions the students had about the lecture material. (See Appendix E for a list of discussion questions addressed to the students.)
The final twenty-five minutes were spent in a small group activity designed to give students practice in applying Van Manen's (1977) levels of reflectivity in analyzing classroom situations from their own educational experiences. Students were asked to think back over their years of elementary, secondary, and college education and to identify one or two classroom incidents that stood out in their memories. After students identified one or two classroom incidents to reflect upon, they gathered into small groups of two or three and briefly shared the selected experiences. Students then discussed the situations and reflected on them using Van Manen's three levels of reflection. To help guide students' reflections and discussions, handouts were distributed summarizing the three levels of reflection and listing the types of questions to be asked at each level (see Appendix E). After about fifteen minutes, the students reconvened into a large group and shared insights and generalizations about teaching they had formulated in their small group sessions (see Appendix E).

On the following Monday, Tuesday, and Wednesday, the two classes in this treatment level participated in Reflective Teaching for two hours per day, following the same format and using the same Reflective Teaching lessons as described previously for students in level one.
By the conclusion of the experimental treatment, each student in the level two treatment condition had (1) heard a 45-minute lecture on theoretical knowledge about reflective thinking and reflective teaching; (2) participated in a discussion on the role of reflective thinking in their own lives and in the work of classroom teachers; (3) applied Van Manen's levels of reflectivity in analyzing classroom teaching situations; (4) received handouts summarizing key points of the lecture on reflective thinking; (5) planned, executed, and evaluated one fifteen-minute small-group peer teaching lesson; (6) assessed their learners' achievement and satisfaction upon completion of the lesson; (7) led one ten-minute small-group discussion analyzing and reflecting on their own teaching; (8) participated as learners in five Reflective Teaching lessons; (9) participated in five small group discussions analyzing and reflecting on their observations of others' teaching; (10) participated in six large group discussions analyzing and reflecting on their own teaching, their observations of other teachers, and perennial issues in teaching; and (11) rated five peer teachers using the Learner Satisfaction Forms (see Appendix D).

**Level 3: Control Group.** The three groups assigned to this level of the independent variable participated in neither Reflective Teaching nor Reflective Teaching supplemented with conceptual/theoretical knowledge.
Instead, course instructors were asked to follow their normal course schedules.

On the four days of the study, the first control group participated in the following regularly scheduled activities: a lecture on and discussion of Erikson's (1980) stages of psychosocial development, small group discussion and interaction on the topic of Erikson's stages of psychosocial development, a field visit to a nursery school, a large-group discussion of students' observations of and reactions to the nursery school visit, a lecture and discussion on Kohlberg's (1963) stages of moral development, and a lecture and discussion on the development of self concept in elementary and secondary students. On the same four days, the second control group visited a preschool, participated in a large-group discussion on students' observations of and reactions to the preschool visit, wrote essays on the students' observations of the preschool, and heard several lectures and participated in several large and small group discussions on the physical, personal, and social development of school-age children. On the four days of the study, the third control group participated in the following regularly scheduled class activities: a lecture and discussion on Erikson's (1980) stages of psychosocial development, viewing a film on Erikson's (1980) theory of psychosocial development, a lecture and discussion on issues affecting adolescents, a lecture and discussion on
Kohlberg's (1963) stages of moral development, a lecture and discussion on education for emotional growth, and an in-class quiz.

In summarizing the activities of the three control groups during the course of this study, it is clear that the control groups participated in typical activities for introductory undergraduate education courses: lecture, discussion, small group interaction, and visits to field sites. None of the three control groups' activities departed substantially from the typical activities occurring in typical introductory education courses, nor did they differ substantially from each other. Furthermore, the topics covered in each of the three control groups during the course of this study were similar to each other and typical of the content of introductory education courses. In this way, the activities of the control groups met the needs of the researcher for the purposes of this study. It was the intention of this study to compare the effects of (1) participation in Reflective Teaching, (2) participation in augmented Reflective Teaching, and (3) no participation in Reflective Teaching or the theoretical component; i.e., participation in the usual activities of the typical undergraduate introductory education course.
Instructors' Preparation for Conducting Reflective Teaching.

Four groups of students participated in Reflective Teaching, two groups at level one of the experimental treatment and two groups at level two. Therefore, four instructors were involved in conducting the Reflective Teaching sessions. Because the Reflective Teaching sessions were conducted by four different instructors, it was necessary to ensure that each instructor was adequately prepared to conduct the Reflective Teaching sessions. Upon investigation of the instructors' prior experience with Reflective Teaching, it was determined that no further preparation was needed for three of the instructors. These three instructors had studied the development and use of Reflective Teaching in an upper-level graduate course in teacher education with the primary developer of Reflective Teaching, Donald R. Cruickshank. In this course, the instructors had considered the rationale for the use of Reflective Teaching with preservice teachers, reviewed the Reflective Teaching materials, studied the college instructor's role, and participated in Reflective Teaching sessions either as designated teachers or as learners. In addition, these three instructors had participated in a workshop for graduate teaching associates in which the use of Reflective Teaching was again reviewed, demonstrated, and practiced. These three instructors also had fairly
extensive previous experience in using Reflective Teaching with preservice students.

The fourth instructor had not taken the graduate level courses in teacher education, and thus had not studied the development and use of Reflective Teaching. However, this instructor had participated in the workshop for graduate teaching associates in which the use of Reflective Teaching was demonstrated and practiced. In addition, the instructor had used Reflective Teaching with preservice teachers in the previous quarter. Because of this instructor's less extensive involvement with Reflective Teaching, the researcher conducted a one-hour training session with the instructor.

In this training session, the researcher and the course instructor discussed the rationale for and the objectives of Reflective Teaching. It was emphasized that the primary purpose for Reflective Teaching was to provide students with the opportunity to analyze and reflect upon a lesson they had experienced either as teachers or as learners. Each part of the Reflective Teaching procedure was explained in detail, and a time schedule was constructed for use in the Reflective Teaching sessions. The large and small group discussion questions were read and discussed. The six selected Reflective Teaching lessons were reviewed, compared, and contrasted. The researcher shared insights from previous experience with using these six Reflective
Teaching lessons; for example, the types of issues, comments, and questions that each lesson had provoked in the past. Upon conclusion of the training session, the researcher and instructor both felt confident in the instructor’s understanding of the rationale for Reflective Teaching and the procedures followed in the Reflective Teaching session. In addition, the researcher and this instructor met daily throughout the study to discuss the Reflective Teaching sessions occurring that day and to ensure that the sessions were conducted as described in the Reflective Teaching materials.

All Reflective Teaching lessons, learner satisfaction forms, learner achievement tests, small group discussion questions, and large group discussion questions were duplicated and assembled by the researcher. A form for recording the designated teachers assigned to each Reflective Teaching session was also developed by the researcher (see Appendix F). Additionally, an instruction sheet for course instructors was developed summarizing key points for the course instructors to follow (see Appendix C). All these materials were assembled by the researcher and distributed to the course instructors three weeks prior to the Reflective Teaching sessions.

Upon completion of the experimental treatments, the researcher debriefed each instructor to ensure that the Reflective Teaching sessions had proceeded as planned.
Course instructors reported that all six Reflective Teaching sessions for all four classes had proceeded as planned; i.e., they followed exactly the format and procedures described in the Reflective Teaching Manual (Cruickshank, et al., 1981).

Instrumentation

In order to achieve the objectives of the study, it was necessary to have some means of assessing the dependent variable: subjects' reflectivity in analyzing classroom teaching situations. However, no methodology or instrumentation was readily available for this purpose. A thorough review of the literature in the fields of education, psychology, and philosophy yielded very limited information regarding the assessment of reflectivity in any context. Only two methods related to assessing level or quality of reflection were located, and only one of those proved useful for the purposes of this study.

The method selected for assessing subjects' reflectivity in this study was a modified form of the Reflective Teaching Index developed by Zeichner and Liston in 1985, based upon the work of Van Manen (1977) and Gauthier (1963). Zeichner and Liston's Reflective Teaching
Index was originally developed in order to assess the quality of thinking elicited and expressed during supervisory conferences in a student teaching program. As originally developed, the Reflective Teaching Index consisted of a content analysis of thought units uttered during student teaching supervisory conferences. Each thought unit was placed in one of four major categories: factual discourse, prudential discourse, justificatory discourse, and critical discourse. Each of these four major categories was also subdivided into several subcategories. The percentage of thought units falling into each of the major categories and subcategories was calculated for each conference. In addition, a Reflective Teaching Index (RTI) was computed by combining those categories closely related to reflective thinking: explanatory/hypothetical discourse, justificatory discourse, and critical discourse. Subjects' RTI scores represented the percentage of their thought units falling into these three categories.

Close inspection of the types of thinking included in the Reflective Teaching Index (Zeichner & Liston, 1985) revealed that these categories of thought were closely related to the stated goals of both the Reflective Teaching regimen and the theoretical component developed to supplement Reflective Teaching. For this reason, Zeichner and Liston's (1985) content analysis method for assessing quality of thinking was selected for use in this study. A
thorough description of this content analysis method is provided in a later section.

In order to assess subjects' reflectivity it was also necessary to obtain some sample of their thinking or reasoning in relation to teaching. Zeichner and Liston's (1985) method of individual interviews in the context of supervisory conferences was judged to be logistically impractical because of the large sample size. Since obtaining samples of verbal discourse was ruled out for logistical reasons, the remaining alternative was obtaining samples of subjects' written discourse. Thus it was determined that subjects would be asked to reflect on and write about teaching.

In both the Zeichner and Liston (1985) study and an earlier study of Reflective Teaching by Cruickshank, Kennedy, Williams, Holton, and Fay (1981), subjects were asked to reflect on their own teaching. Zeichner and Liston's (1985) subjects were student teachers and thus had recent, significant teaching experiences upon which to reflect. Subjects in the Cruickshank et al. (1981) study were also asked to reflect on their own teaching in completing the sentence stem, "When I think about teaching..."

While reflecting on one's own teaching is certainly a desirable activity, many of the subjects in this study lacked sufficient personal teaching experience to serve as
an adequate stimulus for reflection. Since Education 450, the course in which the subjects were enrolled, was an introductory education course, many of the students had no previous teaching experience. Some students had previously completed the Freshman Early Experience Program (FEEP), a program wherein students serve primarily as teacher's aides and do very little, if any, actual teaching. Additionally, students could not be asked to reflect upon their teaching in the Reflective Teaching regimen since the control groups had not participated in that activity. Thus it was judged that some students would be unable to reflect upon and write about their own teaching, due to lack of experience.

For this reason, a videotaped classroom teaching episode was provided for subjects to reflect on and write about. In other words, subjects were asked to reflect on someone else's teaching rather than their own. In addition to the lack of personal teaching experience on the part of some subjects, further justification for this approach includes the following. First, the Reflective Teaching regimen itself requires students to observe, reflect upon, and discuss the teaching behaviors of others. Thus students specifically participated in reflecting on others' teaching behaviors during the Reflective Teaching sessions. Therefore, the posttest task of reflecting on others' teaching was not a new or unfamiliar task for the subjects in the Reflective Teaching groups. In addition, students in
preservice education courses are frequently asked to observe, reflect upon, and learn from others' teaching. Introductory education courses, general methods courses, and nearly all special methods courses require students to observe teachers in field placements. Students are expected to observe, reflect upon, and learn from these placement experiences, in many cases providing written reports about their observations and reflections. From such observations and subsequent reflections, students derive generalizations about the process of teaching. Thus it would seem that observing and reflecting upon the teaching of others is an important and justifiable experience in and of itself, as well as preparing students for later reflection upon their own teaching.

For these reasons, then, the method selected for assessing subjects' reflectivity in this study consisted of having subjects view a videotaped classroom teaching episode, reflect on their observations of the episode, and write an essay about their reflections.

For the pretest and the posttest, subjects viewed 15-minute videotaped classroom teaching episodes. To help them follow the lesson, subjects were provided with typescripts of the classroom discourse. Subjects were also given a packet containing directions and two pages of paper lined on both sides. After viewing the videotape, and without any discussion of the lesson they observed, students
then spent 20 minutes reflecting on and writing an essay analyzing the classroom teaching episode they observed. These essays, or protocols, were then analyzed using a modified form of Zeichner and Liston's (1985) Reflective Teaching Index. The modifications to Zeichner and Liston's (1985) scheme and the procedures followed in analyzing the protocols are discussed in a later section.

The classroom teaching episode used for the pretest consisted of a sixth-grade lesson on immigration to the United States. Concepts covered in the lesson included immigration, immigrants, ancestors, family trees, native Americans, country of origin, continents, and first-, second-, third-, fourth-, fifth-, and sixth-generation immigrants. In addition to this content, the lesson activities also included a review of graphs and graphing for presentation of quantitative information. The lesson began with a teacher-led discussion of the lesson content. Following this discussion, students worked on both whole-class and individual projects and displays presenting information regarding the ancestry of class members (see Appendix I for a transcript of the lesson).

For the posttest, subjects viewed a 15-minute high-school literature lesson on Edgar Allen Poe's The Telltale Heart. Students in the videotape had been asked to read the story beforehand, and the entire lesson consisted of a teacher-led discussion of the story's characters,
theme, and plot. The teacher began the lesson by suggesting they produce a play based on the story. The class came up with a list of props and characters for the play. In the process of generating this list, they also discussed the atmosphere that would need to be created for the play. The teacher then directed the class to a discussion of questions that had been given the day before. The remainder of the lesson consisted of a discussion of these questions (see Appendix J for a transcript of the lesson).

Both of these videotaped lessons were originally produced as part of a student teaching competition held annually by the National Education Association (NEA). Each year, the NEA invites student teachers to submit videotapes of lessons they have conducted. These videotaped lessons are then judged by a panel of experts and prizes are awarded. In 1986, Donald R. Cruickshank of The Ohio State University acquired copies of these videotapes for use in research on teacher clarity. Permission was obtained from each contestant for use of the videotapes in the clarity research. At a later time, Donald Haefele, another faculty member, obtained permission from approximately twenty of the contestants for use of the videotapes for any research or instructional purpose. Thus approximately twenty videotaped classroom teaching episodes were readily available to this researcher. Because these tapes were readily available, it
was decided to utilize two of the tapes for this study's pretest and posttest, rather than producing new ones.

Each videotape was viewed several times by the researcher. After the initial viewing, a list of criteria was created for use in selecting the tapes to be used in the study. The criteria were: (1) the lesson must include content with which subjects in the study would be familiar, regardless of their academic major; (2) the lesson must be lively and interesting to watch; (3) the two lessons must be fairly similar in regard to quality of teaching practices; i.e., one lesson should not be exceptionally well done and the other one poor; (4) the selected lessons should occur in regular classroom since many of the subjects in the study were not familiar with developmentally handicapped and learning disabled students; and (5) the tapes must be of adequate technical quality for viewing by groups of up to 25 subjects. After the initial viewing, all but six of the tapes were rejected because they did not meet these criteria. These six tapes were viewed several times by the researcher, and two tapes were selected for use in this study because they were judged by the researcher to be the most interesting and the most likely to stimulate reflection among viewers. The tapes were then field tested with a group of 45 students enrolled in Education 450 during the Winter Quarter, 1988. The field test of these pretest and posttest videotapes is described in a later section.
In addition to the pretest and posttest assessment of reflectivity in analyzing these classroom teaching situations, a test of students' theoretical knowledge about reflective thinking was also administered. This brief, two-page instrument was developed by the researcher (see Appendix H). The items contained in the instrument covered knowledge about reflective thinking in general and reflective thinking in the context of classroom teaching. All material covered in the instrument was included in the theoretical component which supplemented Reflective Teaching for the two groups in the level two treatment condition.

One purpose for administering this assessment of theoretical knowledge was to determine whether subjects in treatment levels one and three were already familiar with this theoretical content without having participated in the theoretical component contained in level two. A second purpose was to determine whether students in level two, Reflective Teaching supplemented with a theoretical component, actually learned the material covered in the theoretical part of the treatment. The third and final purpose was to determine whether subjects' theoretical knowledge about reflection was correlated with their reflectivity in analyzing classroom teaching situations. In other words, was there a correlation between students' scores on the theoretical test and the reflectivity rating of their essays?
Validity of Instrumentation

No a priori information on the validity of this instrumentation was available. However, the validity of using this method for the purposes of this investigation can be at least partially established by comparing the stated goals and objectives of Reflective Teaching with the types of thinking represented by the categories of the Reflective Teaching Index. In other words, do the types of thinking identified as reflective by the Reflective Teaching Index coincide with the types of thinking that the Reflective Teaching regimen seeks to promote?

In order to answer this question, a close inspection of the categories of discourse identified in the Reflective Teaching Index (Zeichner & Liston, 1985) was necessary. Each of the four major categories (i.e., factual discourse, prudential discourse, justificatory discourse, and critical discourse), and each of the subcategories is described below.

Factual Discourse is analysis oriented toward describing what is, what was, or what will be. There are four types of factual discourse:

1. Descriptive discourse represents an account of factors related to the specific observation, and is verifiable in terms of observational tests.
2. **Informational discourse** is concerned with the identification of information pertinent to the observation but not verifiable by observational tests applied to the specific lesson under analysis.

3. **Hermeneutic discourse** focuses on the meanings created by any of the participants in the setting of the classroom.

4. **Explanatory/hypothetical discourse** is characterized by attempts to identify causal relationships operating in the educational setting. This type of thinking or discourse is considered to be reflective; that is, thought units falling into this category are included in calculating the Reflective Teaching Index rating.

**Prudential Discourse** is concerned with suggestions and advice regarding pedagogical actions and with evaluations of the worth and quality of such actions. There are four types of prudential discourse, and, in Zeichner and Liston's (1985) scheme, none of them are included when calculating the Reflective Teaching Index. In other words, these types of discourse do not exhibit reflective thought.
1. **Instruction**: when the observer states that the teacher should try a particular procedure, without providing a rationale or justification for the suggested method.

2. **Advice/opinion**: when the observer identifies and suggests two or more courses of action the teacher should think about using, without providing a rationale or justification for the suggested methods.

3. **Evaluation**: when the observer renders a positive or negative judgment about the value, worth, or quality of an action, without justifying or supporting that evaluation.

4. **Support**: when an empathetic response or emotive encouragement is given in relation to past, present, or future action.

**Justificatory Discourse** entails the identification of various types of reasons and rationales underlying past, present, or future pedagogical actions. This type of discourse is primarily concerned with consideration of questions of why do this, in this way, with these particular students. Justificatory discourse is divided into three subcategories based upon the types of rationales offered as the reason for
actions. All three of the subcategories of justificatory discourse are included when computing the Reflective Teaching Index rating. In other words, justificatory discourse is considered to exhibit reflective thinking.

1. A **pragmatic rationale** employs criteria which point to what is effective or efficient in a situation; i.e., justification on the basis of what "works" in a given situation.

2. An **intrinsic rationale** justifies an action on the basis of claims about universal knowledge, universal values (e.g., honesty, fairness), and student needs (e.g., level of maturation).

3. An **extrinsic rationale** is applied to criteria external to the situation and present actions, including such things as potential utility to society and the vocational needs of students.

**Critical Discourse** assesses the adequacy of rationales offered within the realm of justificatory discourse or assesses the values embedded in the form and content of curriculum materials and instructional practices (i.e., the hidden curriculum). Four types of critical discourse are identified according to the substance of that which is being assessed: pragmatic, intrinsic,
extrinsic, and hidden curriculum. All four types of critical discourse are included when calculating the Reflective Teaching Index rating. In other words, critical discourse is considered to exhibit reflective thought.

According to Zeichner and Liston (1985), the categories of explanatory/hypothetical discourse, justificatory discourse, and critical discourse evidence reflective thought and thus are included when computing the Reflective Teaching Index.

To establish the validity of using the Reflective Teaching Index for this study, it was necessary to determine whether these categories of explanatory/hypothetical discourse, justificatory discourse, and critical discourse correspond with the stated goals of the Reflective Teaching regimen and the theoretical component developed to supplement Reflective Teaching.

A review of the literature on Reflective Teaching and reflective thinking yielded the following desired outcomes for thinking reflectively about classroom teaching:

Preservice teachers should:

1. produce generalizations about teaching, learning, and learners (Cruickshank, 1987)
2. be aware of the conscious and unconscious determinants of classroom behavior (Cruickshank, 1986b, 1987)

3. see complex relationships among the teacher's characteristics and training, the learner's characteristics, the learning environment, the content to be taught, and teaching behaviors (Cruickshank, 1982)

4. consider the intended and unintended effects of actions (Cruickshank, 1987)

5. identify variables associated with effective teaching performance (Cruickshank, 1984)

6. ask basic questions about what is happening and why (Cruickshank, 1987)

7. disregard unfounded commitment about schooling, learning, and teaching (Cruickshank, 1986b)

8. examine classroom life with an eye toward improving it (Cruickshank & Applegate, 1981)

9. raise critical questions (Cruickshank, 1987)

10. examine beliefs regarding teaching and learning (Cruickshank, 1986b, 1987)
11. critically examine taken-for-granted ideas
(Cruickshank, 1987)

Goals one through four above correspond with the "explanatory/hypothetical discourse" category on the Reflective Teaching Index. This type of thinking attempts to ascertain the underlying causes for classroom behavior; to link actions with effects; and to understand complex relationships among a variety of classroom variables. This type of thinking is promoted by the Reflective Teaching regimen and is identified and included in the Reflective Teaching Index rating scale.

Goals five and six correspond with the "justificatory discourse" category on the Reflective Teaching Index. This type of thinking assesses the effectiveness of teaching methods and attempts to provide a rationale for classroom instructional procedures and goals. This type of thinking, too, is both promoted by the Reflective Teaching regimen and is identified and included in the Reflective Teaching Index.

Goals seven through eleven correspond to the category of "critical discourse" on the Reflective Teaching Index. This type of thinking attempts to go beyond taken-for-granted ideas and beliefs in order to critically examine what happens in the classroom. Unfounded commitments about schooling, teaching, and learning are identified and discarded, and underlying assumptions and biases are
Table 5.
Reflective Teaching Goals and their Corresponding
Reflective Teaching Index Discourse Categories

<table>
<thead>
<tr>
<th>Goals/Objectives of Reflective Teaching</th>
<th>Reflective Teaching Index Discourse Categories</th>
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<tbody>
<tr>
<td>Preservice teachers should:</td>
<td></td>
</tr>
<tr>
<td>1. produce generalizations about teaching, learning, and learners.</td>
<td></td>
</tr>
<tr>
<td>2. be aware of the conscious and unconscious determinants of behavior.</td>
<td>Explanatory/Hypothetical Discourse</td>
</tr>
<tr>
<td>3. see complex relationships among the teacher's characteristics and training, the learner's characteristics, the learning environment, the content to be taught, and teaching behaviors.</td>
<td></td>
</tr>
<tr>
<td>4. consider the intended and unintended consequences of actions.</td>
<td></td>
</tr>
<tr>
<td>5. identify variables associated with effective teaching performance.</td>
<td>Justificatory Discourse</td>
</tr>
<tr>
<td>6. ask basic questions about what is happening and why.</td>
<td></td>
</tr>
<tr>
<td>7. disregard unfounded commitments about schooling, learning, and teaching.</td>
<td></td>
</tr>
<tr>
<td>8. examine classroom life with an eye toward improving it.</td>
<td></td>
</tr>
<tr>
<td>9. raise critical questions.</td>
<td>Critical Discourse</td>
</tr>
<tr>
<td>10. examine beliefs regarding teaching and learning.</td>
<td></td>
</tr>
<tr>
<td>11. critically examine taken-for-granted ideas.</td>
<td></td>
</tr>
</tbody>
</table>
appraised. This type of thinking is both promoted by the Reflective Teaching regimen and identified and included in the Reflective Teaching Index.

Additionally, the Reflective Teaching Index is partially based on van Manen's levels of reflectivity (Zeichner & Liston, 1985). The category of justificatory discourse corresponds to van Manen's second level of reflectivity, and the critical discourse category corresponds to van Manen's third level of reflectivity. Thus an analysis of the types of thinking identified by the Reflective Teaching Index reveals that they are closely related to both the theoretical notions of reflective thinking and the stated goals of Reflective Teaching. The Reflective Teaching Index, then, would appear to be a valid instrument for the purposes of this study; i.e., it identifies in subjects' written work the types of discourse and thinking that Reflective Teaching seeks to promote.

Field Test of Instrumentation

During the Winter Quarter, 1988, the pretest and posttest used in this study were field tested on one section of Education 450, Professional Introduction to Education. The purposes of this field test were: (1) to ensure that the directions and procedures were clear and easily understood by the students; (2) to determine whether the videotapes were of adequate technical quality; (3) to
determine whether the pretest and posttest did indeed stimulate the types of reflection sought in this study; (4) to determine the amount of time needed by most students to complete the task; and (5) to compute a reliability coefficient on pretest and posttest scores.

The section participating in the field test consisted of 45 students and included a distribution of sophomores, juniors, seniors, and post-baccalaureate students similar to that of the sample used the actual study. There were 27 females and 18 males, and a wide range of academic majors. In terms of academic rank, sex, and college major, then, the sample of students participating in the field test and the sample of students participating in the actual study were very similar.

The field test session was conducted as follows. Pretest materials were distributed and directions were provided both orally and in writing (see Appendix I). Students viewed the pretest videotape and, with no further discussion, were asked to reflect on and analyze the classroom teaching episode they observed. Students were given all the time they needed to complete their written analyses. After a short break, posttest materials were distributed and directions were again provided both orally and in writing. Students viewed the posttest videotape and, with no class discussion, reflected on the second classroom
teaching episode they observed. Students again were given all the time needed to complete their written analyses.

Based on the field test of the pretest and posttest materials, it was determined that the directions were clearly understood by the students, and that the types of reflection sought by this study did appear in the students' written essays. Additionally, the technical quality of the videotapes was determined to be adequate for the purposes of the study. The field test also revealed that all but two students completed their written analyses within 15 to 20 minutes. Thus it was determined that 20 minutes would be the time frame allotted for the pre- and posttest analyses.

To determine the alternate-forms reliability between the pretest and the posttest, a Pearson product-moment correlation was computed for each of the three subscores. The pretest-posttest reliability coefficient for the explanatory/hypothetical discourse category was .87; the coefficient for the justificatory discourse category was .80, and the coefficient for the critical discourse category was .87. These correlation coefficients were judged to be an adequate indication that the pretest and posttest yielded similar scores for subjects when administered consecutively with no intervening treatment.
Data Collection Procedures

Pretests were administered to four of the seven treatment groups prior to any treatment activities, during the regularly scheduled class time and in the regular classrooms. Course instructors administered the pretests, treating them as a part of the regular class activities. Students were given a packet containing directions, two sheets of paper lined on both sides, and a typescript of the dialogue in the videotape. Instructors read the directions aloud to the students, but provided no further directions or discussion. The directions were thus provided both orally and in writing as follows:

You will see a 15-minute videotape of a classroom teaching episode. In this episode, you will view a sixth-grade social studies lesson on "Our American Roots." To help you follow and think about the discussion, you have been given a typescript of the classroom dialogue. After viewing the videotape, you will be asked to write an essay analyzing the classroom teaching/learning episode you observed. You will have twenty minutes to think about and write an analysis of this teaching episode.

Upon completion of the treatment activities, the posttest was administered in a similar fashion, during regular class time and in the regular classroom setting. Instructors again were asked to treat the posttest as a regular class activity. Students were given a packet containing directions, two sheets of paper lined on both
sides, and a typescript of the dialogue in the videotape. Instructors read the directions aloud to the students, but provided no further directions or discussion. The directions thus were provided both orally and in writing as follows:

You will see a 15-minute videotape of a classroom teaching episode. In this episode, a high school literature class discusses Edgar Allen Poe's *The Telltale Heart*. To help you follow and think about the discussion, you have been given a typescript of the classroom dialogue. After viewing the videotape, you will be asked to write an essay analyzing the classroom teaching/learning episode you observed. You will have twenty minutes to think about and write an analysis of this teaching episode.

The second posttest, designed to assess students' theoretical knowledge of reflection, was administered immediately after the first posttest. Instructors read the directions aloud to the subjects and distributed the posttests (see Appendix H). Students were given all the time they needed to complete the theoretical posttest.

Data Processing and Analysis

The essays, or protocols, written by the subjects were subjected to a content analysis in order to identify instances of discourse exhibiting reflective thought. Each protocol was divided into thought units, following the procedure described by Bales (1950):
The unit to be scored is the smallest discriminable segment of verbal ... behavior to which the observer, using the set of categories after appropriate training, can assign a classification under conditions of continuous serial scoring... Often the unit will be a single simple sentence expressing or conveying a complete simple thought. (p. 37)

The procedure for dividing the protocols into thought units, then, began with an initial analysis of each sentence. If the sentence was a simple sentence and contained only one category of discourse, it was counted as one thought unit. If the sentence was a complex sentence and clearly contained more than one category of discourse, it was subdivided into more than one thought unit. Most sentences were found to contain one or two thought units, with a few exceptionally long sentences containing three thought units.

As the thought units were identified, they were placed into the discourse categories described in the Reflective Teaching Index (Zeichner & Liston, 1985). The appropriate category for each thought unit was recorded on the Reflective Teaching Index Rating Form (see Appendix K) in the same order in which they occurred in the protocol. After all thought units were identified, placed into categories, and recorded on the rating form, the total number of thought units was tallied. In addition, the number of thought units falling into each of the categories related to reflective thinking was tallied: (1) explanatory/hypothetical discourse, (2) justificatory discourse, and (3) critical discourse. Thus each protocol
received three scores related to three types of reflective thought: (1) the percentage of total thought units falling into the explanatory/hypothetical discourse category; (2) the percentage of total thought units falling into the justificatory discourse category; and (3) the percentage of total thought units falling into the critical discourse category. These three reflective thinking scores for each student were then subjected to statistical analysis.

Rater Training Procedures

Three individuals were trained in the content analysis procedures described above. Two of these individuals were second-year doctoral students majoring in teacher education at The Ohio State University. The third individual was not enrolled in a graduate program at the time of the study, but held bachelor's and master's degrees from The Ohio State University. All three had extensive teaching experience as well. Thus all three individuals rating the protocols in this study were experienced teachers with graduate degrees in education. Each rater was individually trained by the researcher, following the procedures described below. All training activities were carried out with sample protocols from the field test of the instrument. No protocols written by subjects involved in the actual study were used in the rater training process.
As a first step, the researcher provided a brief conceptual overview of the investigation and related theoretical notions about reflective thinking. Next the researcher discussed the operational definitions for each category of discourse included in the Reflective Teaching Index (see Appendix L). When the rater felt confident that he/she understood each discourse category, the researcher presented sample thought units, one at a time, and asked the rater to place them into the appropriate discourse categories. Any difficulties in assigning thought units to the correct categories were discussed, and additional practice was provided if necessary.

As a next step, the researcher defined the thought unit and instructed the rater in how to divide the protocols into thought units. The rater then practiced dividing several protocols into thought units. Any difficulties in this process were discussed, and additional practice was provided if necessary.

When the rater and the researcher felt confident that the rater had mastered the basic content analysis process, the rater practiced the entire rating process on sample protocols from the earlier field test of the instrument. Each of these protocols had previously been rated by the researcher so that comparisons between the ratings of the researcher and the individual raters could be made. Measures of interrater agreement as determined by Scott's
coefficients (Frick & Semmel, 1978) were computed on the practice protocols. When an interrater agreement of .80 or higher was obtained across three consecutive protocols, it was accepted as satisfactory evidence of adequate training. Only then did raters begin rating the protocols written by subjects in this study.

**Rating Procedures**

First, a code number was assigned to each protocol denoting the following information: (1) the treatment group level (one, two, or three), (2) the pretest/no pretest condition (pretest = one, no pretest = two), and (3) the individual student number. Raters were not informed of the meaning of the code numbers. When all raters achieved satisfactory interrater reliability, the rating of protocols for this study was begun.

The protocols from all the treatment groups were shuffled thoroughly. In this way, each of the raters had a mixture of protocols from all treatment levels, as well as some protocols from both the pretest and the posttest. Raters were not informed regarding which protocols were pretests and posttests, nor did they know the treatment groups to which subjects were assigned.

After all the protocols were rated, an interrater reliability coefficient was again computed using Scott's coefficient. Two of the raters had maintained a
satisfactory interrater agreement (γ > .80), but one rater had not. Consequently, the protocols rated by this individual were then rated again by both the researcher and another rater, working independently. As a result, there were three sets of ratings for these protocols: one by the original rater, one by the researcher, and one by another rater who had maintained satisfactory reliability. The three sets of ratings for each protocol were compared, and when disagreement was found, the rating on which two of the three raters agreed was used.

Posttest of Theoretical Knowledge

The posttests of theoretical knowledge were scored by an individual not otherwise involved in this study. The scorer graded the theoretical posttests with no knowledge of subjects' assignment to treatment conditions. An answer key was provided by the researcher, with all acceptable answers included. When the scorer was unsure of whether a given answer should be accepted as correct, he referred the question to the researcher without identifying the subjects' name or number. The scorer and the researcher discussed such items and reached agreement on the appropriate scoring for those items. In this way the researcher was able to provide input into the scoring of questionable responses without the potentially biasing knowledge of the subjects' treatment conditions.
**Statistical Analysis Procedures**

As a first step, stem-and-leaf diagrams and boxplots were constructed for the data of each dependent variable using the Statistical Analysis System (SAS Institute Inc., 1985). Examination of the boxplots and stem-and-leaf diagrams revealed that each batch of data was positively skewed and contained several positive outliers, a not uncommon phenomenon when data are measured or counted, and thus bounded below by zero (Emerson & Stoto, 1983).

Following the recommendation of Emerson and Stoto (1983) and Stevens (1986), the original data values were transformed by taking the square root of each original score. The square root transformation changes the scale of the data in a nonlinear fashion, compressing the scale for larger data values more than the scale for smaller data values (Emerson & Stoto, 1983). Thus the transformation substantially reduced both right-skewness and the number of positive outliers.

Several of the subsequent statistical analyses were conducted on both the raw data and the transformed data. The outcomes of these analyses were essentially the same for both the raw data and the transformed data. Therefore, the remaining statistical tests were conducted only on the transformed data.

The following statistical analysis procedures were used to test the research hypotheses.
Multivariate Analysis of Variance (MANOVA) on Pretest Scores. Since subjects were not randomly assigned to treatment groups, a multivariate analysis of variance was performed on subjects' pretest scores in order to determine whether significant differences existed between the three treatment groups at the outset of the study. Fifty-seven subjects (approximately one-half of the subjects at each treatment level) were pretested. Each pretest yielded three scores: (1) percentage of thought units in the explanatory/hypothetical discourse category, (2) percentage of thought units in the justificatory discourse category, and (3) percentage of thought units in the critical discourse category. These three scores served as the dependent variables for the one-way MANOVA, with treatment groups as the independent variable. Since both the multivariate and univariate test criteria yielded nonsignificant results, no further analysis of pretest scores was undertaken.

Multivariate Analysis of Variance (MANOVA) on Posttest Scores. A multivariate analysis of variance was conducted on subjects' posttest scores in order to test the first two research hypotheses:

Hypothesis 1: Students who participate in Reflective Teaching will exhibit a greater degree of reflectivity in their analysis of classroom teaching situations than will students who have not participated in Reflective Teaching.
Hypothesis 2: Students who participate in augmented Reflective Teaching will exhibit a greater degree of reflectivity in their analysis of classroom teaching situations than will students who participate in the original Reflective Teaching regimen.

The multivariate analysis of variance was a two-way, one-between one-within partial hierarchical MANOVA. The independent variables for the MANOVA were the treatment level (level one, two, or three) and the pretest/no pretest condition (see Table 6).

Table 6.
Design Arrangement for the 2 x 3 Two-Factor MANOVA

<table>
<thead>
<tr>
<th>Pretest Condition:</th>
<th>Treatment Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level 1</td>
</tr>
<tr>
<td>Pretest (B₁)</td>
<td>(A₁)</td>
</tr>
<tr>
<td>No Pretest (B₂)</td>
<td>A₁B₂</td>
</tr>
</tbody>
</table>

The dependent variables for the MANOVA were subjects' scores on the posttest assessing reflectivity in analyzing classroom teaching situations. Each subject received three scores; one for the explanatory/hypothetical discourse category, one for the justificatory discourse category, and
one for the critical discourse category. These three scores, henceforth labeled R1, R2, and R3, were the dependent variables in the MANOVA analysis.

A mixed strategy described by Barker and Parker (1985) for interpreting multivariate research data was utilized:

After a preliminary MANOVA test has been performed, the synthetic variable(s), on which the treatment groups are significantly separated, are examined in order to test hypotheses regarding the rank and nature of the treatment effects on the dependent variables. Then a serious attempt is made to interpret the synthetic variables in terms of the pattern of loadings of the variables on the factors. The contribution of individual variables to the synthetic variables is highlighted. Attention then shifts to ANOVA results for the separate dependent variables. Findings at this level may be considered jointly with those at the synthetic variable level to provide a highly informative indication of the outcome of the research. (p. 39)

The multivariate analysis of variance yielded two discriminant functions, only one of which was significant. The new synthetic variable resulting from this analysis was interpreted by examining the standardized weights and structure coefficients, or correlations between the synthetic variable and each of the dependent variables.

Both Wilk's lambda and Pillai's trace yielded statistically significant results ($p < .001$) for the separation of treatment groups along this synthetic dimension. Since the MANOVA results were significant, treatment-group centroids for this synthetic variable were graphed and Dunn's test was computed to determine which
groups differed from each other in a statistically significant manner.

To aid in further understanding the outcomes of the analysis, the original dependent variables, R1, R2, and R3, were also analyzed. Cell means were graphed separately for each dependent variable. Dunn's tests were then computed to determine which treatment groups differed significantly on each of the original dependent variables.

Repeate d ^ Measure s Analysis of Variance on Posttest Scores. To further corroborate the findings of the multivariate analysis of variance, a repeated measures ANOVA was performed on the same data. In other words, the posttest scores R1, R2, and R3 were treated as repeated measurements on the same subject. By using this repeated measurements design and by blocking on subjects, the variability in the data attributable to stable individual differences among subjects can be identified and removed from error (Kennedy, 1978).

Multivariate Analysis of Variance on Pretest-Posttest Scores. Since treatment groups differed significantly on the posttest scores, the next step was to examine the groups' differences between their pretest and posttest scores. In other words, did subjects in the experimental conditions exhibit greater differences between their pretest and posttest scores than did subjects in the control group?
The analysis selected to examine these differences was a one-between one-within MANOVA on the pretest and posttest scores. This analysis tested research hypothesis three:

Hypothesis 3: Subjects who participate in Reflective Teaching or augmented Reflective Teaching will exhibit a greater difference between their pretest and posttest scores than will students who participate in neither Reflective Teaching nor augmented Reflective Teaching.

Since only about half of the subjects were pretested, the sample size for this analysis was considerably smaller than that for the other analyses. Fifty-seven subjects had both pretest and posttest scores and thus comprised the sample for this analysis. The same mixed strategy was followed for this MANOVA as was followed in the previous MANOVA on posttest scores.

Analysis of Variance of Theoretical Posttest Scores. A one-way analysis of variance was computed using the theoretical posttest scores in order to test research hypothesis four:

Hypothesis 4: Students who participate in augmented Reflective Teaching will score higher on the posttest of theoretical knowledge than will students in the control group or in the Reflective Teaching group.

Upon achieving significance on the one-way analysis of variance, the treatment group means were graphed and the Scheffe' test was employed to make specific comparisons among group means. Through this analysis, it was possible to determine whether students in treatment levels one (the
original Reflective Teaching regimen) and three (the control group) were already knowledgeable about reflective thinking without having participated in the theoretical component contained in treatment level two. In addition, it was possible to determine whether students in level two, augmented Reflective Teaching, actually learned the material covered in the theoretical part of the treatment.

**Pearson Product-Moment Correlation between Scores on Theoretical Posttests and Reflectivity Scores.**

Correlational analyses were computed to test research hypothesis five:

**Hypothesis 5:** There will be a positive correlation between students' theoretical knowledge about reflective thinking and their degree of reflectivity in analyzing classroom teaching situations.

To determine the relationship between students' theoretical knowledge and their overall reflectivity in analyzing classroom teaching situations, a Pearson product-moment correlation was calculated between students' scores on the theoretical posttest and their synthetic scores resulting from the multivariate analysis of variance procedures. This synthetic score was derived by weighting scores on each of the original dependent variables, R1, R2, and R3, by the raw score weights given by the significant discriminant function. In addition, Pearson product-moment correlations
were calculated between the theoretical scores and each of the original dependent variable scores.

**Summary**

The primary objectives of this study were to compare the effects of participation in three treatment conditions on students' reflectivity in analyzing classroom teaching situations. The three treatment conditions were: (1) participation in Reflective Teaching, (2) participation in augmented Reflective Teaching, and (3) the control group. The secondary objectives of this study were: (1) to compare the effects of the three treatment conditions on students' theoretical knowledge about reflective thinking, and (2) to determine the correlation between subjects' theoretical knowledge and their reflectivity when analyzing classroom teaching situations.

To fulfill these purposes, a modified and extended Solomon Four-Group design was implemented. One hundred and twelve students in seven sections of Education 450, Professional Introduction to Education, participated in the study. Treatment conditions were randomly assigned to intact sections of the course. All activities related to the study occurred within the regular classroom and during the regularly scheduled class meeting times. Course instructors conducted the Reflective Teaching sessions and
the researcher conducted the theoretical component for those sections in the level two treatment condition.

In keeping with the Solomon Four-Group design, all subjects were posttested and one-half of the subjects were pretested. Pretests and posttests consisted of students' written analyses of videotaped classroom teaching episodes they observed. These pretest and posttest essays were analyzed by trained raters for evidence of reflective thought using a modified form of the Reflective Teaching Index developed by Zeichner and Liston (1985). Each pretest and posttest received three scores or ratings related to the three types of reflective thought identified by the Reflective Teaching Index. In addition, students completed a brief posttest over theoretical knowledge related to reflective thinking. These pretest and posttest scores were then subjected to statistical analysis procedures in order to test the research hypotheses.
CHAPTER IV

RESULTS

This chapter reports the results of the data analyses employed to test the research hypotheses posed at the outset of the study. The results of each analysis are presented separately, followed by an overall summary of the research findings.

Preliminary Data Exploration

As a first step in the data analysis procedures, stem-and-leaf diagrams and boxplots were constructed for each dependent variable using the Statistical Analysis System (SAS Institute, 1985). Analysis of these figures revealed the presence of right-skewness and positive outliers for each distribution, a not uncommon pattern when data are measured or counted and thus bounded below by zero (Emerson & Stoto, 1983).

Several data transformations were performed in an effort to minimize this right-skewness and the number of positive outliers. Transformations suggested for this purpose are natural logarithms and the family of roots (square roots, cube roots, quadratic roots, and so on) since they compress the scale for larger data values more than they do for smaller data values (Emerson & Stoto, 1983;
Hartwig & Dearing, 1979; Stevens, 1986). Each of these monotonic data transformations were made and subsequent stem-and-leaf diagrams and boxplots were constructed. These figures were examined and compared in order to select the data transformation that resulted in the most nearly symmetrical and normal distributions. The transformation selected as most appropriate for this purpose was the square root transformation. Because of the presence of scores of zero, the sum of .5 was added to each score before the square root was taken. By adding .5 to each score and then taking the square root, the distributions of scores for each variable more closely approximated the normal distribution.

The first major analysis, the multivariate analysis of variance of posttest scores (MANOVA), was calculated on both the raw data and the transformed data. The outcomes of these analyses were essentially the same. Therefore, further analyses were conducted only on the transformed data.

The intercorrelations between the three dependent variables were calculated and are presented in Table 7. None of the correlations between variables achieved statistical significance at the .05 level.
### Table 7.
Variances, Covariances, and Intercorrelations Among the Three Dependent Variables

<table>
<thead>
<tr>
<th></th>
<th>Explanatory/ Hypothetical Discourse</th>
<th>Justificatory Discourse</th>
<th>Critical Discourse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explanatory/ Hypothetical Discourse</td>
<td>3.3468</td>
<td>.0835</td>
<td>-.1643</td>
</tr>
<tr>
<td>Justificatory Discourse</td>
<td>.2812</td>
<td>3.3902</td>
<td>-.0883</td>
</tr>
<tr>
<td>Critical Discourse</td>
<td>-.4488</td>
<td>-.2427</td>
<td>2.2301</td>
</tr>
</tbody>
</table>

**Note:** Variances appear on the principal diagonal; covariances on the lower left, and correlations on the upper right of the matrix.

### Multivariate Analysis of Variance of Pretest Scores

In this investigation, it was not possible to randomly assign subjects to treatment groups. Therefore, groups were not statistically equated by randomization at the outset of the study. However, pretest scores were available for approximately one-half (57) of the subjects. These pretest scores were subjected to a one-way multivariate analysis of variance (MANOVA) in order to determine whether treatment groups differed significantly on the three dependent variables at the outset of the study. The independent variable for this MANOVA was instructional treatment, and
the dependent variables were the three measures of reflectivity: explanatory/hypothetical discourse, justificatory discourse, and critical discourse.

The results of the MANOVA of pretest scores are summarized in Table 8. The results of the MANOVA were not significant; i.e., there were no significant differences between groups at the beginning of the study. In addition to this nonsignificant multivariate result, the univariate $F$ statistic for each of the three dependent variables also showed no significant differences between treatment groups on the three dependent variables (see Table 9).

| Table 8. Summary Table of One-Way Multivariate Analysis of Variance of Pretest Scores |
|---------------------------------|--------|--------|-------|
|                                 | Statistic | $df_n$ | $df_e$ | $F$    |
| Wilks' Lambda                  | .8158   | 6      | 104   | 1.86   |
| Pillai's Trace                 | .1889   | 6      | 106   | 1.84   |
Table 9.
Summary of Univariate Analyses of Variance of Pretest Scores for the Three Dependent Variables

<table>
<thead>
<tr>
<th></th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explanatory/Hypothetical Discourse</td>
<td>2</td>
<td>401.5550</td>
<td>200.7775</td>
<td>2.58</td>
</tr>
<tr>
<td>Justificatory Discourse</td>
<td>2</td>
<td>322.8395</td>
<td>161.4198</td>
<td>2.32</td>
</tr>
<tr>
<td>Critical Discourse</td>
<td>2</td>
<td>.7694</td>
<td>.3847</td>
<td>.54</td>
</tr>
</tbody>
</table>

Thus, although treatment groups were not equated by randomization, the results of these analyses suggest that the groups were not markedly different on the dependent variables at the outset of the study.

Multivariate Analysis of Variance of Posttest Scores

Recall that the primary purpose of this investigation was to compare the effects of participation in three different treatment conditions on subjects' reflectivity when analyzing classroom teaching situations. The three treatment conditions were: (1) participation in the original Reflective Teaching regimen, (2) participation in augmented Reflective Teaching, and (3) the control group. Two research hypotheses were formulated at the outset of the study:
Hypothesis 1: Students who participate in Reflective Teaching will exhibit a greater degree of reflectivity in their analysis of classroom teaching situations than will students who have not participated in Reflective Teaching.

Hypothesis 2: Students who participate in augmented Reflective Teaching will exhibit a greater degree of reflectivity in their analysis of classroom teaching situations than will students who participate in the original Reflective Teaching regimen.

To test these hypotheses, a two-way multivariate analysis of variance was performed. The independent variables for the MANOVA were the treatment level (level one - Reflective Teaching, level two - augmented Reflective Teaching, or level three - control group) and the pretest/no pretest condition. For ease of presentation, these variables will be labeled variable A and variable B, respectively (see Table 10). The independent variable of primary interest (variable A) was the three-level treatment variable, described in detail in Chapter 3. The second independent variable (variable B) contained two levels; i.e., one-half of the subjects were pretested and one-half were not pretested. Variable B was included in order to identify any pretest-treatment interaction that occurred. In this way, the effects of pretesting on the dependent variables were not confounded with the effects of the treatment conditions.
Table 10.
Design Arrangement for the
2 x 3 Two-Factor MANOVA

<table>
<thead>
<tr>
<th>Treatment Condition</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(A₁)</td>
<td>(A₂)</td>
<td>(A₃)</td>
</tr>
<tr>
<td>Pretest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest (B₁)</td>
<td>A₁B₁</td>
<td>A₂B₁</td>
<td>A₃B₁</td>
</tr>
<tr>
<td>No Pretest (B₂)</td>
<td>A₁B₂</td>
<td>A₂B₂</td>
<td>A₃B₂</td>
</tr>
</tbody>
</table>

Note: Level 1 = Reflective Teaching
Level 2 = Augmented Reflective Teaching
Level 3 = Control group

The dependent variables for the MANOVA were subjects' scores on the posttest assessing reflectivity in analyzing classroom teaching situations. Each subject received three scores; one for the explanatory/hypothetical discourse category, one for the justificatory discourse category, and one for the critical discourse category. These three scores, henceforth labeled R₁, R₂, and R₃, were the dependent variables in the MANOVA analysis.

A summary of the MANOVA is shown in Table 11. Both Wilks' lambda and Pillai's trace are in agreement in showing statistical significance at the .0004 level for interaction effects between treatment level and the pretest/no pretest condition. In addition, the main effects for variable A, treatment condition, are significant at the .0001 level.
However, there is a lack of statistical significance at the .05 level for the main effects of variable B, the pretest/no pretest condition.

Table 11.
Summary Table of Two-Way Multivariate Analysis of Variance of Posttest Scores

<table>
<thead>
<tr>
<th>Source</th>
<th>Wilks' Lambda</th>
<th>df_n</th>
<th>df_e</th>
<th>F</th>
<th>Pillai's Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment (A)</td>
<td>.504</td>
<td>6</td>
<td>208</td>
<td>14.16**</td>
<td>.217**</td>
</tr>
<tr>
<td>Pretest/No Pretest (B)</td>
<td>.945</td>
<td>3</td>
<td>104</td>
<td>2.00</td>
<td>.055</td>
</tr>
<tr>
<td>Interaction (AB)</td>
<td>.791</td>
<td>6</td>
<td>208</td>
<td>4.31*</td>
<td>.579*</td>
</tr>
</tbody>
</table>

*p=.0004, **p=.0001.

Since the MANOVA yielded statistically significant results for interaction between the two independent variables, further analyses focused on the interaction effects. Two discriminant functions (roots) were extracted, but only the first achieved significance. Table 12 displays the statistical tests on the roots and indicates that the preponderance of trace was accounted for by the first root, showing that the variations in the data are associated almost exclusively with this one measured achievement dimension.
Table 12.
Statistical Tests of Discriminant Functions
for Interaction Effects

<table>
<thead>
<tr>
<th>Discriminant Function (Root)</th>
<th>Eigenvalue</th>
<th>% Trace</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.2013</td>
<td>79.39</td>
<td>4.31*</td>
</tr>
<tr>
<td>2</td>
<td>.0523</td>
<td>20.61</td>
<td>.95</td>
</tr>
</tbody>
</table>

*p=.0004

Since only the first discriminant function was significant, further analysis focused on interpreting this function in terms of the pattern of loadings of the original variables on this new factor. Table 13 presents the standardized discriminant weights and structure coefficients for the discriminant function. The standardized discriminant weights reflect the unique contribution of each dependent variable to the discriminant function. The structure coefficients represent the correlations between the original dependent variables and the discriminant function scores. As shown in Table 13, the structure coefficients range from .43 to .72. The second dependent variable, R2 (justificatory discourse), has the highest standardized weight and structure coefficient and thus plays the most important role in differentiating between the treatment groups along this discriminant function. The correlations between the other two dependent variables (R1
and R3) and the discriminant function are .43 and .46, respectively, suggesting that they play a less important role in differentiating between the groups along this discriminant function.

Table 13.
Standardized Discriminant Weights and Structure Coefficients for the Three Dependent Variables on the First Discriminant Function

<table>
<thead>
<tr>
<th>Variable</th>
<th>Standardized Discriminant Weight</th>
<th>Structure Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1 Explanatory/Hypothetical Discourse</td>
<td>.058</td>
<td>.43</td>
</tr>
<tr>
<td>R2 Justificatory Discourse</td>
<td>.091</td>
<td>.72</td>
</tr>
<tr>
<td>R3 Critical Discourse</td>
<td>.075</td>
<td>.46</td>
</tr>
</tbody>
</table>

The group centroids on this discriminant function were calculated and are displayed in Table 14. Group centroids are also displayed graphically in Figure 7. As shown in Figure 7, the group centroid for level two of variable A (Augmented Reflective Teaching) is of greater magnitude than the other groups in both the pretested and unpretested condition, followed by the Reflective Teaching group and the control group.
Table 14.
Treatment Group Centroids on the Discriminant Function

<table>
<thead>
<tr>
<th>Treatment Group:</th>
<th>Pretested</th>
<th>Not Pretested</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEVEL 1 Reflective Teaching</td>
<td>.3645</td>
<td>.3410</td>
</tr>
<tr>
<td>LEVEL 2 Augmented Reflective Teaching</td>
<td>.4849</td>
<td>.3547</td>
</tr>
<tr>
<td>LEVEL 3 Control Group</td>
<td>.2379</td>
<td>.3034</td>
</tr>
</tbody>
</table>
Dunn's tests were computed on the group centroids to determine which treatment groups differed significantly on the discriminant function. Dunn's test was selected in order to keep the overall alpha level for all comparisons at an acceptable level of .05. Four comparisons were made: all three possible comparisons at the pretested level and one comparison at the no-pretest level. These comparisons are summarized in Table 15. The critical t for four
comparisons at the .05 overall alpha level ($\alpha = .0125$ for each separate comparison) was 2.55. Table 15 reveals that at the pretested level, treatment group two (augmented Reflective Teaching) scored significantly higher than both treatment group one (Reflective Teaching) and treatment group three (the control group). In addition, treatment group one (Reflective Teaching) scored significantly higher than group three (the control group). Under the condition of no pretest, however, there were no significant differences between any of the treatment groups.

Table 15.
Summary of Dunn's Tests on Group Centroids for the Discriminant Function

<table>
<thead>
<tr>
<th>COMPARISON GROUPS</th>
<th>t-VALUE*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretested Groups</td>
<td></td>
</tr>
<tr>
<td>Levels 2 &amp; 3</td>
<td>9.48**</td>
</tr>
<tr>
<td>Levels 2 &amp; 1</td>
<td>3.94**</td>
</tr>
<tr>
<td>Levels 3 &amp; 1</td>
<td>4.84**</td>
</tr>
<tr>
<td>Unpretested Groups</td>
<td></td>
</tr>
<tr>
<td>Levels 2 &amp; 3</td>
<td>1.31</td>
</tr>
</tbody>
</table>

*The critical t for 4 comparisons and 106 degrees of freedom at an overall alpha level of .05 is 2.55.

**p < .0125.

Note: Level 1 = Reflective Teaching
Level 2 = Augmented Reflective Teaching
Level 3 = Control group
The interaction effects can be summarized as follows. When combined with pretesting, the experimental treatments yielded statistically significant differences between all three treatment groups. The augmented Reflective Teaching group scored highest, followed by the Reflective Teaching group, followed by the control group. With no pretest, however, the groups did not differ significantly.

Another way of analyzing the interaction effects is to compare the pretested and unpretested groups at each level of variable A. At level one, Reflective Teaching, there is essentially no difference between the pretested and unpretested groups. In other words, subjects' scores at this level did not differ significantly whether they were pretested or not. At level two, however, subjects who were pretested scored significantly higher than subjects who were not pretested. One possible explanation for this is that the pretest in some way prepared the students to better understand the theoretical component of their treatment activities. Perhaps the pretest activity of trying to analyze a classroom teaching situation helped subjects to better understand and assimilate the theoretical notions that were presented during their treatment activities. In other words, students could relate the ideas presented in the theoretical lecture to a recent, concrete experience with thinking reflectively about a classroom situation.
Finally, at level three of the treatment condition, the control group, there was no significant difference between the pretested and unpretested groups. Thus the interaction effects of treatment and pretesting were most evident for the augmented Reflective Teaching group.

Analysis of Main Effects for Variable A. Examination of the graph of group centroids in Figure 7 reveals that the interaction effects are ordinal in nature; i.e., the group centroids associated with levels of variable A occupy the same ordinal position at each level of variable B. In addition, the MANOVA yielded significant results for variable A, the treatment condition. Thus it is appropriate to make an overall statement about the main effects for treatment level across both the pretested and unpretested conditions. To make the appropriate comparisons, groups in levels of A were collapsed over levels of B. The centroids for these combined groups are displayed in Table 16. Dunn’s tests were performed to determine whether the groups differed significantly. As shown in Table 17, all three groups differed significantly from each other. The augmented Reflective Teaching group scored significantly higher than both the Reflective Teaching group and the control group. In addition, the Reflective Teaching group scored significantly higher than the control group.
Table 16.
Group Centroids on the Discriminant Function, with Levels of A Collapsed over Levels of B

<table>
<thead>
<tr>
<th>Group:</th>
<th>Centroid:</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEVEL 1</td>
<td>.3733</td>
</tr>
<tr>
<td>Reflective Teaching</td>
<td></td>
</tr>
<tr>
<td>LEVEL 2</td>
<td>.4311</td>
</tr>
<tr>
<td>Augmented Reflective Teaching</td>
<td></td>
</tr>
<tr>
<td>LEVEL 3</td>
<td>.2659</td>
</tr>
<tr>
<td>Control Group</td>
<td></td>
</tr>
</tbody>
</table>

Table 17.
Summary of Dunn's Tests on Group Centroids for the Discriminant Function, Collapsing over Levels of B

<table>
<thead>
<tr>
<th>COMPARISON GROUPS</th>
<th>t-VALUE*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levels 2 &amp; 3</td>
<td>8.14**</td>
</tr>
<tr>
<td>Levels 2 &amp; 1</td>
<td>2.71**</td>
</tr>
<tr>
<td>Levels 1 &amp; 3</td>
<td>5.65**</td>
</tr>
</tbody>
</table>

*The critical t for 3 comparisons and 106 degrees of freedom at an overall alpha level of .05 is 2.44.

**p<.017.

Note: Level 1 = Reflective Teaching
      Level 2 = Augmented Reflective Teaching
      Level 3 = Control group
Summary of Multivariate Results

The two-way factorial MANOVA yielded significant results for both interaction and variable A, but not for variable B. In analyzing the interaction effects, one discriminant function or root was extracted, yielding a new synthetic variable. This discriminant function was explained primarily by dependent variable R2, justificatory discourse, and to a lesser extent, by dependent variables R1 and R3, explanatory/hypothetical discourse and critical discourse. Group centroids were calculated and graphed for this discriminant function, and Dunn's tests were performed to determine which groups differed significantly from each other along this dimension. Under level one of variable B (pretest condition), the three treatment conditions were all found to differ significantly from one another. The augmented Reflective Teaching group was significantly higher than both the Reflective Teaching group and the control group. In addition, the Reflective Teaching group was significantly higher than the control group. However, under the second level of variable B (no pretest), there were no significant differences among any of the three treatment groups.

Since the interaction was ordinal, there were main effects for variable A, which also needed to be interpreted. Therefore levels of A were collapsed over levels of B, group centroids were calculated, and Dunn's tests were performed
to determine which groups differed significantly from each other. Significant main effects were found for variable A, with the augmented Reflective Teaching group scoring significantly higher than both the Reflective Teaching group and the control group. In addition, the Reflective Teaching group scored significantly higher than the control group.

In terms of the discriminant function scores, then, the Reflective Teaching group achieved significantly higher reflectivity ratings than did the control group. Thus hypothesis one was supported by this analysis. In addition, the augmented Reflective Teaching group achieved significantly higher reflectivity ratings than both the control group and the Reflective Teaching group. Thus hypothesis two was also supported by the findings of this analysis.

Examination of Univariate Findings

An alternative strategy for examining the results of this analysis is to focus on the separate univariate findings. Barker and Barker (1985) recommend that findings at the univariate level be considered jointly with those at the synthetic variable (multivariate) level to provide a more informative indication of the outcomes of the research. In keeping with their recommendation and in accordance with the Hummel-Sligo (1971) strategy, the univariate F tests for the three original dependent variables were examined. The
univariate analysis of variance outcomes for each of the separate dependent variables are discussed below.

**Explanatory/Hypothetical Discourse.** The univariate analysis of variance (ANOVA) for the first dependent variable, explanatory/hypothetical discourse, is summarized in Table 18. This analysis yielded a significant $F$ statistic for interaction and for the main effects of variable A, instructional treatment.

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>$F$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment Level (A)</td>
<td>2</td>
<td>41.5074</td>
<td>20.7537</td>
<td>7.13**</td>
</tr>
<tr>
<td>Pretest/No Pretest (B)</td>
<td>1</td>
<td>0.1289</td>
<td>0.1289</td>
<td>0.04</td>
</tr>
<tr>
<td>Treatment Level X Pretest/No Pretest (AB)</td>
<td>2</td>
<td>21.6619</td>
<td>10.8309</td>
<td>3.72*</td>
</tr>
<tr>
<td>Error (S/AB)</td>
<td>106</td>
<td>308.6337</td>
<td>2.9116</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>111</td>
<td>371.9319</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*$p<.05$. **$p<.001$. 

Table 18. ANOVA Summary Table for Explanatory/Hypothetical Discourse Scores
Since significance was found for the interaction effects, cell means were graphed in order to examine the nature of the interaction. Cell means are presented in Table 19 and are displayed graphically in Figure 8.

Table 19.
Means of Treatment Groups for Dependent Variable R1:
Explanatory/Hypothetical Discourse Scores

<table>
<thead>
<tr>
<th></th>
<th>Pretest</th>
<th>No Pretest</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEVEL 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reflective Teaching</td>
<td>4.58</td>
<td>3.65</td>
</tr>
<tr>
<td>LEVEL 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Augmented Reflective Teaching</td>
<td>3.59</td>
<td>3.22</td>
</tr>
<tr>
<td>LEVEL 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Group</td>
<td>2.13</td>
<td>3.21</td>
</tr>
</tbody>
</table>
Examination of Figure 8 reveals that the interaction is ordinal in nature. Level one of variable A (Reflective Teaching) is superior to both of the other two treatment groups at both levels of B, the pretest/no pretest condition. In addition, level two of variable A (augmented Reflective Teaching) is superior to the control group across both levels of B.

Dunn's tests were computed to determine whether the groups differed significantly from each other. Under the condition of pretesting, both the Reflective Teaching group and the augmented Reflective Teaching group scored significantly higher than did the control group. However, the Reflective Teaching group and the augmented Reflective
Teaching group did not differ significantly from each other. Under the condition of no pretest, none of the groups differed significantly from each other.

Since the nature of the interaction was ordinal, conclusions can be drawn for the overall main effects of variable A. Therefore groups in levels of A were collapsed over levels of B and new means were calculated. When collapsed over levels of B, the treatment group means were: Level 1 = 4.0169; Level 2 = 3.4367; and Level 3 = 2.6155. Subsequent Dunn's tests indicated that the Reflective Teaching regimen resulted in significantly higher scores for the dependent variable of explanatory/hypothetical discourse in comparison to the control group, but not in comparison to the augmented Reflective Teaching. The augmented Reflective Teaching group also scored higher than the control group on this variable, but not significantly so.

**Justificatory Discourse.** The univariate analysis of variance (ANOVA) for the second dependent variable, justificatory discourse, is summarized in Table 20. This analysis also yielded a significant F statistic for interaction and for the main effects of variable A, instructional treatment.
Table 20.
ANOVA Summary Table for
Justificatory Discourse Scores

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment Level (A)</td>
<td>2</td>
<td>68.4484</td>
<td>34.2242</td>
<td>13.98**</td>
</tr>
<tr>
<td>Pretest/No Pretest (B)</td>
<td>1</td>
<td>3.9299</td>
<td>3.9299</td>
<td>1.60</td>
</tr>
<tr>
<td>Treatment Level X</td>
<td>2</td>
<td>23.4959</td>
<td>11.7479</td>
<td>4.80*</td>
</tr>
<tr>
<td>Pretest/No Pretest (AB)</td>
<td>106</td>
<td>259.5856</td>
<td>2.4489</td>
<td></td>
</tr>
<tr>
<td>Error (S/AB)</td>
<td>111</td>
<td>355.4598</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<.01. **p<.0001.

Since significance was found for the interaction effects, cell means were graphed in order to examine the nature of the interaction. Cell means are presented in Table 21 and are displayed graphically in Figure 9.
Table 21.
Means of Treatment Groups for Dependent Variable R2: Justificatory Discourse Scores

<table>
<thead>
<tr>
<th>Level</th>
<th>Pretest</th>
<th>No Pretest</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEVEL 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reflective Teaching</td>
<td>3.53</td>
<td>4.51</td>
</tr>
<tr>
<td>LEVEL 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Augmented Reflective Teaching</td>
<td>3.99</td>
<td>2.98</td>
</tr>
<tr>
<td>LEVEL 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Group</td>
<td>2.63</td>
<td>2.83</td>
</tr>
</tbody>
</table>

![Graph](image)

Pretest
No Pretest
(B₁) (B₂)

A₁ = Reflective Teaching
A₂ = Augmented Reflective Teaching
A₃ = Control Group

Figure 9.
Graph of Cell Means for Dependent Variable R2: Justificatory Discourse Scores
Examination of Figure 9 reveals that the interaction is disordinal in nature. Under the pretest condition the augmented Reflective Teaching group is superior, while under the no pretest condition, the Reflective Teaching group is superior. Therefore no statements about overall main effects for variable A can be made in relation to the second dependent variable, justificatory discourse.

Dunn's tests were computed to determine which groups differed significantly from each other. Under the pretest condition, both the augmented Reflective Teaching group and the Reflective Teaching group scored significantly higher than the control group, but did not differ significantly from each other. Under the no pretest condition, the Reflective Teaching group scored significantly higher than both the control group and the augmented Reflective Teaching group.

**Critical Discourse.** The univariate analysis of variance (ANOVA) for the third dependent variable, critical discourse, is summarized in Table 22. In contrast to the previous univariate analyses, this analysis did not yield a significant F statistic for interaction. However, the F statistic for variable A, treatment level, is significant.
Table 22.
ANOVA Summary Table for Dependent Variable R3:
Critical Discourse Scores

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment Level (A)</td>
<td>2</td>
<td>59.9702</td>
<td>29.9851</td>
<td>19.46*</td>
</tr>
<tr>
<td>Pretest/No Pretest (B)</td>
<td>1</td>
<td>7.5612</td>
<td>7.5612</td>
<td>4.91</td>
</tr>
<tr>
<td>Treatment Level X Pretest/No Pretest (AB)</td>
<td>2</td>
<td>7.9850</td>
<td>3.9250</td>
<td>2.59</td>
</tr>
<tr>
<td>Error (S/AB)</td>
<td>106</td>
<td>163.3553</td>
<td>1.5411</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>111</td>
<td>238.8717</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<.0001.

Cell means are presented in Table 23 and are displayed graphically in Figure 10. Examination of Figure 10 reveals that the Reflective Teaching supplemented with theory group is superior to both the Reflective Teaching group and the control group on the third dependent variable, critical discourse.
Table 23.
Means of Treatment Groups for Dependent Variable R3:
Critical Discourse Scores

<table>
<thead>
<tr>
<th>Level</th>
<th>Pretest</th>
<th>No Pretest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reflective Teaching</td>
<td>0.87</td>
<td>0.79</td>
</tr>
<tr>
<td>Level 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Augmented Reflective Teaching</td>
<td>3.44</td>
<td>2.08</td>
</tr>
<tr>
<td>Level 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Group</td>
<td>1.58</td>
<td>1.41</td>
</tr>
</tbody>
</table>

5
4  \( *A_2 \)
3
2 \( *A_3 \)  \( *A_2 \)  \( *A_3 \)
1 \( *A_1 \)  \( *A_2 \)  \( *A_3 \)  \( *A_1 \)
0

Pretest  No Pretest

\( A_1 = \) Reflective Teaching
\( A_2 = \) Augmented Reflective Teaching
\( A_3 = \) Control group

Figure 10.
Graph of Cell Means for Dependent Variable R3:
Critical Discourse Scores
Since the F statistic for interaction was not significant, cell means were collapsed for levels of A over levels of B and new means were calculated. When collapsed over levels of B, the treatment group means for critical discourse were: Level 1 = .8179; Level 2 = 2.8754; Level 3 = 1.5029. Dunn’s tests were computed to determine which groups differed significantly from each other. Results of the Dunn’s tests indicated significant differences between all the groups. The augmented Reflective Teaching group achieved significantly higher scores on the critical discourse variable than both the control group and the Reflective Teaching group. Contrary to expectations, the control group scored significantly higher than the Reflective Teaching group on the critical discourse variable.

**Summary of Univariate Findings**

The univariate ANOVAs yielded statistically significant interaction effects for the first two dependent variables, Explanatory/hypothetical discourse and justificatory discourse. Interaction for the explanatory/hypothetical discourse category was ordinal, allowing the conclusion that there were significant main effects for variable A over levels of B. The Reflective Teaching group and the augmented Reflective Teaching group both scored
significantly higher than the control group on the explanatory/hypothetical discourse variable.

For justificatory discourse, however, interaction was disordinal. When pretested, the Reflective Teaching group and the augmented Reflective Teaching group both scored significantly higher than the control group. When there was no pretest, however, only the Reflective Teaching group scored significantly higher than the control group.

Analyses for the third dependent variable, critical discourse, yielded no significant interaction effects. However, the main effects for variable A, treatment level, were significant. The augmented Reflective Teaching group scored significantly higher than both the Reflective Teaching group and the control group on this variable. In addition, the control group scored significantly higher than the Reflective Teaching group on this critical discourse variable.

In summarizing these results, it seems that the Reflective Teaching regimen has the greatest positive effect on the explanatory/hypothetical variable, while the augmented Reflective Teaching regimen has the greatest positive effect on the critical discourse variable. For the justificatory discourse variable, the Reflective Teaching regimen had the greater effect under conditions of no pretesting, while the augmented Reflective Teaching regimen had the greater effect when combined with pretesting.²
Multivariate Analysis of Variance of Pretest and Posttest Scores

The next step in analyzing the data generated by this study was to examine the differences between the pretest and posttest scores of those subjects for which both sets of scores were available. This analysis was a test of hypothesis three:

Hypothesis 3: Subjects who participate in Reflective Teaching or augmented Reflective Teaching will exhibit a greater difference between their pretest and posttest scores than will subjects who participate in neither Reflective Teaching nor augmented Reflective Teaching.

Fifty-seven subjects had taken the pretest, approximately one-half of the subjects at each level of the instructional treatment. In order to compare the pretest and posttest scores for each treatment group, a two-way factorial MANOVA was performed on the pretest and posttest scores. One independent variable for this MANOVA was the instructional treatment level: (1) Reflective Teaching, (2) augmented Reflective Teaching, and (3) the control group. The second independent variable was the time of testing; i.e., either (1) the posttest, or (2) the pretest.
Table 25.
Design Arrangement for the 2 x 3 Two-Factor MANOVA on Pretest and Posttest Scores

<table>
<thead>
<tr>
<th>Time of Testing:</th>
<th>Level 1 (A₁)</th>
<th>Level 2 (A₂)</th>
<th>Level 3 (A₃)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posttest (B₁)</td>
<td>A₁B₁</td>
<td>A₂B₁</td>
<td>A₃B₁</td>
</tr>
<tr>
<td>Pretest (B₂)</td>
<td>A₁B₂</td>
<td>A₂B₂</td>
<td>A₃B₂</td>
</tr>
</tbody>
</table>

Note: Level 1 = Reflective Teaching  
Level 2 = Augmented Reflective Teaching  
Level 3 = Control Group

The dependent variables for this MANOVA were the subjects' scores on the pretest and posttest assessing reflectivity in analyzing classroom teaching situations. Each subject received three scores for the pretest and three scores for the posttest: (1) explanatory/hypothetical discourse, (2) justificatory discourse, and (3) critical discourse. These sets of scores for the pretests and posttests served as the dependent variables for this analysis.

A summary of the MANOVA is shown in Table 26. Both Wilks’ lambda and Pillai’s trace are in agreement in showing statistical significance at the .0001 level for interaction effects between treatment level and time of testing.
Table 26.
Summary Table of Two-Way MANOVA on Pretest and Posttest Scores

<table>
<thead>
<tr>
<th>Source</th>
<th>Wilks’ Lambda</th>
<th>df_n</th>
<th>df_e</th>
<th>F</th>
<th>Pillai’s Trace</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment (A)</td>
<td>.617</td>
<td>6</td>
<td>212</td>
<td>9.64*</td>
<td>.427</td>
<td>9.69*</td>
</tr>
<tr>
<td>Time of Testing (B)</td>
<td>.635</td>
<td>3</td>
<td>106</td>
<td>20.33*</td>
<td>.565</td>
<td>20.33*</td>
</tr>
<tr>
<td>Interaction (AB)</td>
<td>.629</td>
<td>6</td>
<td>212</td>
<td>9.22*</td>
<td>.410</td>
<td>9.20*</td>
</tr>
</tbody>
</table>

*p=.0001

Since the MANOVA yielded statistically significant results for interaction between the instructional treatment and the time of testing, further analyses focused on the interaction effects. Two discriminant functions (roots) were extracted and tested for significance. Table 27 displays the statistical tests on these roots and indicates that both are significant.

Table 27.
Statistical Tests of Discriminant Functions for Interaction Effects on MANOVA of Pretest and Posttest Scores

<table>
<thead>
<tr>
<th>Discriminant Function (Root)</th>
<th>Eigenvalue</th>
<th>% Trace</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.3517</td>
<td>66.58</td>
<td>9.22*</td>
</tr>
<tr>
<td>2</td>
<td>.1765</td>
<td>33.42</td>
<td>2.99**</td>
</tr>
</tbody>
</table>

*p=.0001.  **p<.01.
Since both discriminant functions were significant, further analysis focused on interpreting these functions in terms of the pattern of loadings of the original variables on each new factor. Table 28 presents the standardized discriminant weights and the structure coefficients for the discriminant functions. The standardized discriminant weights reflect the unique contribution of each dependent variable to the discriminant function. The structure coefficients represent the correlations between the original dependent variables and the discriminant function scores. As shown in Table 28, the first discriminant function is composed primarily of the third dependent variable, critical discourse, and to a lesser extent, the second dependent variable, justificatory discourse, with structure coefficients of .86 and .53, respectively. The first discriminant function, then, could be interpreted as a combination of R3 and R2, critical discourse and justificatory discourse.

The second discriminant function, on the other hand, is composed primarily of the first dependent variable, explanatory/hypothetical discourse. The third dependent variable, critical discourse, is negatively correlated with this discriminant function. Thus, the second discriminant function is characterized by the presence of explanatory/hypothetical discourse and the absence of critical discourse.
Table 28.
Standardized Discriminant Weights and Structure Coefficients for the Three Dependent Variables on the Two Discriminant Functions

<table>
<thead>
<tr>
<th>Variable</th>
<th>Discriminant Function I</th>
<th></th>
<th>Discriminant Function II</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standardized Discriminant Weight</td>
<td>Structure Coefficient</td>
<td>Standardized Discriminant Weight</td>
<td>Structure Coefficient</td>
<td></td>
</tr>
<tr>
<td>R1</td>
<td>.041</td>
<td>.39</td>
<td>.094</td>
<td>.88</td>
<td></td>
</tr>
<tr>
<td>R2</td>
<td>.050</td>
<td>.53</td>
<td>.006</td>
<td>.15</td>
<td></td>
</tr>
<tr>
<td>R3</td>
<td>.110</td>
<td>.86</td>
<td>-.050</td>
<td>-.44</td>
<td></td>
</tr>
</tbody>
</table>

Note: R1 = Explanatory/Hypothetical Discourse  
R2 = Justificatory Discourse  
R3 = Critical Discourse

Table 29.
Treatment Group Centroids on the Two Discriminant Functions

<table>
<thead>
<tr>
<th>Treatment Group</th>
<th>Discriminant Function I</th>
<th></th>
<th>Discriminant Function II</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Posttest</td>
<td>Pretest</td>
<td>Posttest</td>
<td>Pretest</td>
<td></td>
</tr>
<tr>
<td>LEVEL 1</td>
<td>Reflective Teaching</td>
<td>.2676</td>
<td>.1923</td>
<td>.2060</td>
<td>.0766</td>
</tr>
<tr>
<td>LEVEL 2</td>
<td>Augmented Reflective Teaching</td>
<td>.4691</td>
<td>.1753</td>
<td>.0627</td>
<td>.0758</td>
</tr>
<tr>
<td>LEVEL 3</td>
<td>Control Group</td>
<td>.2200</td>
<td>.1802</td>
<td>.1279</td>
<td>.1152</td>
</tr>
</tbody>
</table>
Treatment group centroids on these discriminant functions were calculated and are displayed in Table 29. Figure 11 depicts a graph of the treatment group centroids on both discriminant functions across the two testing times. In examining these tables, it is apparent that all three treatment groups' pretests and the control group's posttest form a cluster. The posttests of the Reflective Teaching group and the augmented Reflective Teaching group, however, are isolated. In other words, all three treatment groups began with nearly the same discriminant function scores. The control group showed little change from the pretest to the posttest, while both the Reflective Teaching group and the augmented Reflective Teaching group showed considerable change from pretest to posttest.

Further examination of Figure 11 reveals that these two groups changed along different dimensions. The augmented Reflective Teaching group showed no change along discriminant function two, while it showed a considerable increase along discriminant function one. The Reflective Teaching group, on the other hand, showed the most change on discriminant function two, with a lesser increase along discriminant function one.

Considering the factor loadings of the original dependent variables on these discriminant functions, it is apparent that the Reflective Teaching group showed the greatest increase from pretest to posttest on the
explanatory/hypothetical discourse variable. The augmented Reflective Teaching group showed an increase along the first discriminant function which is composed of both the critical discourse and justificatory discourse variables. The control group showed essentially no change along either dimension.

Discriminant Function I

\[ 0.50 \quad A_2 B_1 \]

\[ 0.45 \quad A_1 B_1 \]

\[ 0.40 \quad A_1 B_2 \]

\[ 0.35 \]

\[ 0.30 \quad A_2 B_2 \]

\[ 0.25 \]

\[ 0.20 \quad A_3 B_1 \]

\[ 0.15 \quad A_3 B_2 \]

\[ 0.10 \]

\[ 0.05 \]

\[ 0.00 \]

\[ 0.05 \quad 0.10 \quad 0.15 \quad 0.20 \quad 0.25 \]

Discriminant Function II

\[ A_1 = \text{Reflective Teaching} \]

\[ B_1 = \text{Posttest} \]

\[ A_2 = \text{Augmented Reflective Teaching} \]

\[ B_2 = \text{Pretest} \]

\[ A_3 = \text{Control Group} \]

Figure 11.
Graph of Treatment Group Centroids on the Two Discriminant Functions
In order to determine whether the separations between the group centroids on the discriminant functions (see Figure 11) were statistically significant, three Hotelling's $T^2$ tests were performed. This procedure is recommended by Barker and Barker (1985) when the comparisons are selected a priori and the weights for determining the synthetic scores are derived from the data being analyzed. Following Barker and Barker's recommendation, Hotelling's $T^2$ tests were performed to compare the pretest and posttest centroids for each treatment level. The outcomes of these tests are summarized in Table 30. As hypothesized, the differences between the pretest and posttest for both the Reflective Teaching group and the augmented Reflective Teaching group were statistically significant, while the control group did not exhibit a statistically significant difference between the pretest and posttest. Thus hypothesis four was supported by this analysis.
Table 30. Summary of Hotelling's $T^2$ Tests on Pretest and Posttest Centroids at Three Treatment Levels

<table>
<thead>
<tr>
<th>Comparison Groups</th>
<th>$df_n$</th>
<th>$df_e$</th>
<th>$F$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1 pretest - posttest</td>
<td>2</td>
<td>27</td>
<td>11.42*</td>
</tr>
<tr>
<td>Level 2 pretest - posttest</td>
<td>2</td>
<td>31</td>
<td>23.96*</td>
</tr>
<tr>
<td>Level 3 pretest - posttest</td>
<td>2</td>
<td>47</td>
<td>2.77</td>
</tr>
</tbody>
</table>

*p < .001.

Note: Level 1 = Reflective Teaching
Level 2 = Augmented Reflective Teaching
Level 3 = Control group

To further pinpoint where the statistically significant differences existed, treatment group centroids for the two discriminant functions were graphed separately (see Figures 12 & 13). Analysis of these graphs further supports the findings that: (1) changes from the pretest to the posttest for the control group were virtually nonexistent; (2) the Reflective Teaching group changed primarily along the second discriminant function; and (3) the augmented Reflective Teaching group changed primarily along the first discriminant function.
Figure 12.
Graph of Treatment Group Centroids along Discriminant Function I

A₁ = Reflective Teaching
A₂ = Augmented Reflective Teaching
A₃ = Control group
Summary of Multivariate Results

The two-way factorial MANOVA yielded significant results for the interaction of treatment level and time of testing. In other words, there were significant differences between the treatment groups in terms of the amount of change they exhibited between the pretest and the posttest. Two significant discriminant functions (roots) were extracted. The first discriminant function consisted primarily of the third dependent variable, critical discourse, and to a lesser extent, the second dependent variable, justificatory discourse. The second significant discriminant function was comprised primarily of the first
dependent variable, explanatory/hypothetical discourse. Group centroids were calculated and graphed for these discriminant functions, and Hotellings $T^2$ tests were performed to determine which groups changed significantly from the pretest to the posttest.

The Reflective Teaching group changed significantly along the second discriminant function, explained primarily by the explanatory/hypothetical discourse variable. The augmented Reflective Teaching group changed significantly from the pretest to the posttest along the first discriminant function, explained primarily by critical discourse and justificatory discourse. The control group showed no significant changes from the pretest to the posttest along either dimension.

**Examination of Univariate Findings**

According to the Hummel-Sligo (1971) strategy, the significant MANOVA tests entitle the investigator to perform univariate $F$ tests on the separate dependent variables. This strategy was followed in order to gain additional information regarding the research outcomes, and to further substantiate the multivariate results. Table 30 presents a summary of the univariate $F$ tests of the interaction between instructional treatment and time of testing.
Table 31.  
ANOVA Summary of Interaction between Instructional Treatment and Time of Testing

<table>
<thead>
<tr>
<th>Variable</th>
<th>Treatment MS</th>
<th>Error MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explanatory/Hypothetical Discourse</td>
<td>58.5278</td>
<td>29.2639</td>
<td>9.98*</td>
</tr>
<tr>
<td>Justificatory Discourse</td>
<td>22.1412</td>
<td>11.0707</td>
<td>4.37**</td>
</tr>
<tr>
<td>Critical Discourse</td>
<td>27.3835</td>
<td>13.6918</td>
<td>14.08*</td>
</tr>
</tbody>
</table>

*p<.0001. **p<.01.

As revealed in Table 31, interaction between instructional level and time of testing was significant for all three dependent variables at the .01 level. To more fully analyze these interaction effects, cell means were graphed for each dependent variable (see Figures 14, 15 and 16). As depicted in these graphs, the univariate analyses yielded essentially the same results as the MANOVA. Dunn's tests were performed on selected pairs of means to determine whether treatment group means differed significantly from the pretest to the posttest. For the first dependent variable, explanatory/hypothetical discourse, the Reflective Teaching group showed the greatest increase from the pretest to the posttest. The augmented Reflective Teaching group also showed a statistically significant increase, while the control group did not (see Table 32).
Figure 14.
Graph of Cell Means for Explanatory/Hypothetical Discourse

Table 32.
Summary of Dunn's Tests on Treatment Groups' Pretest and Posttest Means for Explanatory/Hypothetical Discourse*

<table>
<thead>
<tr>
<th>Treatment Group</th>
<th>Pretest Mean</th>
<th>Posttest Mean</th>
<th>t-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>1.8419</td>
<td>4.5764</td>
<td>4.37**</td>
</tr>
<tr>
<td>Level 2</td>
<td>1.9743</td>
<td>3.5886</td>
<td>2.75**</td>
</tr>
<tr>
<td>Level 3</td>
<td>2.7572</td>
<td>2.1348</td>
<td>1.28</td>
</tr>
</tbody>
</table>

*Critical $t(\alpha=.05)$ for 3 comparisons ($df_e=108$) is 2.44 **p<.01.
Note: Level 1 = Reflective Teaching
   Level 2 = Augmented Reflective Teaching
   Level 3 = Control group
For the second dependent variable, justificatory discourse, the augmented Reflective Teaching group showed a statistically significant increase from the pretest to the posttest while the Reflective Teaching group and the control group did not (see Table 33).

\[ A_1 = \text{Reflective Teaching} \]
\[ A_2 = \text{Augmented Reflective Teaching} \]
\[ A_3 = \text{Control group} \]

Figure 15.
Graph of Cell Means for Justificatory Discourse
Table 33.
Summary of Dunn's Tests on Treatment Groups' Pretest and Posttest Means for Justificatory Discourse*

<table>
<thead>
<tr>
<th>Treatment Group</th>
<th>Pretest Mean</th>
<th>Posttest Mean</th>
<th>t-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>3.4096</td>
<td>3.5330</td>
<td>.21</td>
</tr>
<tr>
<td>Level 2</td>
<td>2.4030</td>
<td>3.9970</td>
<td>2.92**</td>
</tr>
<tr>
<td>Level 3</td>
<td>2.1146</td>
<td>1.6310</td>
<td>1.07</td>
</tr>
</tbody>
</table>

*Critical t(α=.05) for 3 comparisons (df_e=108) is 2.44. p<.01.
Note: Level 1 = Reflective Teaching
      Level 2 = Augmented Reflective Teaching
      Level 3 = Control group

For the third dependent variable, critical discourse, the augmented Reflective Teaching group showed a statistically significant increase from the pretest to the posttest, while the Reflective Teaching group did not. The control group showed a small increase from pretest to posttest, but the difference was not statistically significant (see Table 34).
Figure 16.
Graph of Cell Means
for Critical Discourse

Table 34.
Summary of Dunn’s Tests on
Treatment Groups’ Pretest and Posttest Means
for Critical Discourse*

<table>
<thead>
<tr>
<th>Level</th>
<th>Pretest Mean</th>
<th>Posttest Mean</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>.7071</td>
<td>.8664</td>
<td>.43</td>
</tr>
<tr>
<td>Level 2</td>
<td>.8067</td>
<td>3.4390</td>
<td>7.78**</td>
</tr>
<tr>
<td>Level 3</td>
<td>.7595</td>
<td>1.5769</td>
<td>.76</td>
</tr>
</tbody>
</table>

*Critical $t(\alpha=.05)$ for 3 comparisons ($df_e=108$) is 2.44.
**p<.01.

Note: Level 1 = Reflective Teaching
       Level 2 = Augmented Reflective Teaching
       Level 3 = Control group
Summary of Univariate Results

The three univariate ANOVAs and subsequent Dunn's tests revealed that the Reflective Teaching group showed a statistically significant change from the pretest to the posttest on only one dependent variable, explanatory/hypothetical discourse. The augmented Reflective Teaching group, on the other hand, showed a statistically significant increase from the pretest to the posttest on all three dependent variables: explanatory/hypothetical discourse, justificatory discourse, and critical discourse. The control group showed no statistically significant increases from the pretest to the posttest on any of the dependent variables.

Summary of Multivariate and Univariate Analysis of Pretest and Posttest Scores.

Multivariate and univariate analyses of variance were conducted on the pretest and posttest scores of the 57 subjects for whom both sets of scores were available. Both the multivariate and univariate analyses yielded essentially the same results. Statistically significant changes from pretest to posttest were evident for both the Reflective Teaching group and the augmented Reflective Teaching group. The control group, however, showed no significant change from pretest to posttest.
While both the Reflective Teaching group and the augmented Reflective Teaching group showed statistically significant changes from the pretest to the posttest, the nature of that change differed for these two groups. Both the multivariate and univariate analyses indicated that the Reflective Teaching group changed primarily in relation to the explanatory/hypothetical discourse variable. The augmented Reflective Teaching group, on the other hand, showed significant changes for all three dependent variables, with the most notable change in the critical discourse variable. These outcomes are consistent with the previously reported results of the MANOVA analysis of posttest scores for all 112 subjects.

Analysis of Theoretical Posttest Scores

Another goal of this study was to investigate the relationship between subjects' theoretical knowledge about reflective thinking and their reflectivity in analyzing classroom teaching situations. In other words, is increased theoretical knowledge about the processes and outcomes of reflection related to increased reflectivity in practice? To investigate this question, subjects in one treatment level were instructed in theoretical knowledge about reflective thinking, in addition to the original Reflective Teaching regimen. Subsequent analyses were conducted to
determine the impact of this theoretical component on subjects' reflectivity in analyzing classroom teaching situations.

As described in previous sections of this chapter, the subjects in the level two treatment group (augmented Reflective Teaching) scored significantly higher than both the other two treatment groups on the discriminant function generated by the MANOVA analysis of posttest scores. This discriminant function was a linear combination of the three original dependent variables that maximally separated the groups. In the univariate analyses that followed the significant MANOVA results, subjects participating in the theoretical component scored significantly higher than other subjects on the dependent variable of critical discourse.

The MANOVA analysis of pretest and posttest scores indicated that the group instructed in theoretical knowledge showed statistically significant gains on all the dependent measures, while the Reflective Teaching group showed significant gains only for the explanatory/hypothetical variable, and the control group showed no significant gains at all. These MANOVA analyses of pretest and posttest scores, then, would seem to indicate that increased theoretical knowledge is indeed related to increased reflectivity in analyzing classroom teaching situations. To examine the question more thoroughly, however, further analyses were undertaken.
As a first step, it was necessary to determine whether subjects participating in the theoretical component were indeed more knowledgeable about reflection than were the other two groups at the conclusion of the treatment activities. In other words, did subjects comprehend and assimilate the material presented in the theoretical component to the extent that they were consequently more knowledgeable about reflection than subjects in the other treatment groups? At the outset of the study, it was hypothesized that this would be the case:

Hypothesis 4: Students who participate in augmented Reflective Teaching will score higher on the posttest of theoretical knowledge than will students in the control group or the Reflective Teaching group.

To test this hypothesis, a one-way analysis of variance (ANOVA) was conducted on the theoretical posttest scores. The results of this ANOVA are presented in Table 35.
Table 35.
Summary Table of Analysis of Variance of Theoretical Posttest Scores

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructional Treatment (A)</td>
<td>2</td>
<td>48169.8988</td>
<td>24084.9494</td>
<td>73.84*</td>
</tr>
<tr>
<td>Error (S/A)</td>
<td>109</td>
<td>35555.1025</td>
<td>326.1936</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>111</td>
<td>83725.0012</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<.0001

As a follow-up to these highly significant ANOVA findings, Dunn's tests were computed to determine which groups differed significantly from each other. Treatment group means and standard deviations are presented in Table 36, and the outcomes of the Dunn's tests are summarized in Table 37.

Table 36.
Treatment Group Means and Standard Deviations for Theoretical Posttest Scores

<table>
<thead>
<tr>
<th>Instructional Treatment</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Mean</td>
<td>28.73</td>
<td>74.14</td>
<td>25.37</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>15.94</td>
<td>20.81</td>
<td>17.85</td>
</tr>
</tbody>
</table>

Note: Level 1 = Reflective Teaching  
Level 2 = Augmented Reflective Teaching  
Level 3 = Control group
Table 37.
Summary of Dunn's Tests on Group Means
For Theoretical Posttest Scores

<table>
<thead>
<tr>
<th>Comparison Groups</th>
<th>t-Value:*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 2 - Level 1</td>
<td>10.20**</td>
</tr>
<tr>
<td>Level 2 - Level 3</td>
<td>11.34**</td>
</tr>
<tr>
<td>Level 1 - Level 3</td>
<td>.84</td>
</tr>
</tbody>
</table>

*Critical \( t(a=.05) \) for 3 comparisons (\( df_e=109 \)) is 2.43.
**\( P<.05 \).

Note: Level 1 = Reflective Teaching
      Level 2 = Augmented Reflective Teaching
      Level 3 = Control group

Examination of Tables 36 and 37 reveals that the group instructed in theoretical knowledge scored significantly higher on the theoretical posttest than both the control group and the Reflective Teaching group. In addition, the Reflective Teaching group and the control group did not differ significantly on their theoretical posttest scores. Thus hypothesis four is supported by this analysis. In addition, it can be concluded that the theoretical component administered as part of the level two treatment conditions was effective in teaching theoretical knowledge about the processes and outcomes of reflective thinking. Based on the scores of treatment groups one and three, it would also appear that students do not acquire this theoretical knowledge in other parts of the teacher education program at The Ohio State University.
Hypothesis five stated that:

There will be a positive correlation between students' theoretical knowledge about reflective thinking and their degree of reflectivity in analyzing classroom teaching situations.

To determine the relationship between theoretical knowledge and overall reflectivity in analyzing classroom teaching situations, a Pearson product-moment correlation coefficient was calculated on students' theoretical posttest scores and their discriminant function scores from the posttest MANOVA analysis. The discriminant function score was used for this analysis since it represented a linear combination of all three dependent variables, and thus gave an overall reflectivity rating that maximally separated treatment groups. Using this method, a Pearson r of +.41 was obtained. Thus hypothesis six was supported; i.e., there is a moderate positive correlation between subjects' theoretical posttest scores and their overall reflectivity ratings.

In addition, a Pearson product-moment correlation was calculated between each of the three original reflectivity variables and the theoretical posttest scores. These three correlations were also positive, but weaker than the correlation between the discriminant function score and the theoretical posttest scores (see Table 38).
Table 38. Pearson Product-Moment Correlations Between Reflectivity Scores and Theoretical Posttest Scores

<table>
<thead>
<tr>
<th></th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1: Explanatory/Hypothetical Discourse</td>
<td>.20*</td>
</tr>
<tr>
<td>R2: Justificatory Discourse</td>
<td>.24**</td>
</tr>
<tr>
<td>R3: Critical Discourse</td>
<td>.28**</td>
</tr>
<tr>
<td>Discriminant Function Score</td>
<td>.41***</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01, ***p<.0001.

In terms of the original dependent variables, the strongest correlation occurred between the theoretical posttests score and the critical discourse score. The weakest correlation was found between the explanatory/hypothetical discourse score and the theoretical posttest scores. This result is consistent with the MANOVA findings presented earlier wherein the augmented Reflective Teaching group scored significantly higher than the other groups on the critical discourse variable, but not on the explanatory/hypothetical discourse variable.

Summary

Several sets of data were generated by this study: (1) three posttest scores for each of the 112 subjects, assessing their reflectivity in terms of explanatory/hypothetical discourse, justificatory discourse, and
critical discourse; (2) three pretest scores for 57 of the subjects, yielding scores for explanatory/hypothetical discourse, justificatory discourse, and critical discourse; and (3) theoretical posttest scores for all 112 subjects, indicating the level of their theoretical knowledge related to the processes and outcomes of reflection. The statistical procedures utilized in analyzing these data sets are briefly described below, along with a synopsis of their outcomes.

Pretest MANOVA. Since treatment groups were not statistically equated by randomization at the outset of the study, a MANOVA analysis of the pretest scores was computed. Results of this analysis indicated that there were no significant differences between the treatment groups in terms of the dependent variables at the beginning of the study, despite the lack of random assignment of subjects to groups.

Posttest MANOVA. The 112 posttest scores were analyzed using a two-way factorial MANOVA. The independent variables were treatment level and pretest/no pretest condition. Results of this MANOVA indicated significance for interaction of treatment level and pretesting. When pretested, there were significant differences between all three treatment groups, with the augmented Reflective Teaching group scoring highest, followed by the Reflective
Teaching group, followed by the control group. When no pretest was administered, however, there were no significant differences between the treatment groups. In examining the group means at each level, it was noted that for the augmented Reflective Teaching group, subjects who were pretested scored significantly higher than subjects who were not pretested. For the other two treatment levels, however, there were essentially no differences between the pretested and unpretested groups. Thus the effects of interaction between treatment and pretesting occurred primarily for level two, the augmented Reflective Teaching group.

Since the interaction was ordinal in nature, the main effects of variable A, treatment level, were examined. Results indicated that across both pretested and unpretested conditions, the augmented Reflective Teaching group scored highest, followed by the Reflective Teaching group, followed by the control group.

Following these significant multivariate results, the univariate F tests for each of the three dependent variables was examined. The Reflective Teaching group scored highest on the explanatory/hypothetical discourse variable across both the pretested and unpretested conditions. The augmented Reflective Teaching group scored highest on the critical discourse variable across both the pretested and unpretested conditions. For the justificatory discourse variable, the Reflective Teaching group scored highest under
conditions of no pretesting, while the augmented Reflective Teaching group scored highest when pretesting occurred.

**Pretest and Posttest MANOVA.** Both pretest and posttest scores were available for 57 of the subjects. These scores were subjected to a two-way MANOVA, with treatment level and time of testing (pretest or posttest) serving as the independent variables. Results of this MANOVA indicated that there were significant differences between the treatment groups in terms of the amount of change they exhibited from the pretest to the posttest along the two significant discriminant functions. The Reflective Teaching group changed significantly from pretest to posttest along the second discriminant function, explained primarily by the explanatory/hypothetical discourse variable. The augmented Reflective Teaching group changed significantly from the pretest to the posttest along the first discriminant function, explained primarily by critical discourse and justificatory discourse. The control group showed no significant changes from the pretest to the posttest along either dimension.

Following the significant multivariate results, the univariate F statistics were examined and Dunn’s tests were computed on selected pairs of means. This univariate analysis was consistent with the multivariate outcomes, indicating that the Reflective Teaching group differed
significantly from pretest to posttest on only one dependent variable, explanatory/hypothetical discourse. The augmented Reflective Teaching group, however, showed significant gains on all three dependent variables. The control group showed no statistically significant changes from the pretest to the posttest on any of the dependent variables.

Analysis of Theoretical Posttest Scores. Theoretical posttest scores were available for all 112 subjects. Results of an ANOVA analysis of these scores indicated that, as hypothesized, the augmented Reflective Teaching group scored significantly higher than both the Reflective Teaching group and the control group. The Reflective Teaching group and the control group did not differ significantly. Thus it was concluded that the theoretical component included in the level two treatment was effective in teaching theoretical knowledge about the processes and outcomes of reflection.

In addition a Pearson product-moment correlation coefficient was calculated between subjects' theoretical posttest scores and the discriminant function scores generated by the posttest MANOVA. A moderate positive correlation was found between subjects' theoretical knowledge and their overall reflectivity ratings. In addition, a positive correlation was found between subjects'
theoretical posttest scores and each of the three dependent variables.

Each of the analyses described in this chapter will be discussed and conclusions will be drawn in Chapter V.
Footnotes:

1 The mean square error term for the Dunn's test was computed with the following triple product: the row vector of raw score weights, postmultiplied by the within group variance/covariance matrix, postmultiplied by the column vector of raw score weights.

2 To further corroborate the multivariate analysis of variance of posttest scores described in this chapter, a repeated measures analysis of variance (ANOVA) was performed on the same data. In other words, the posttest scores R1, R2, and R3 were treated as repeated measures on the same subject. By using this repeated measurements design, the variability in the data attributable to stable individual differences was identified and removed from error (Kennedy, 1978).

Independent variables for the repeated measures ANOVA were: (A) instructional treatment: Reflective Teaching, augmented Reflective Teaching, and the control group; (B) the pretest/no pretest condition; and (C) the type of measurement: R1, R2, or R3. Results of the ANOVA are presented in Table 38.

Examination of Table 38 indicates significance at the .001 level for the interaction of treatment level and pretesting (AB). In addition, there is significance at the
.0001 level for the main effects of variable A, instructional treatment. These significant findings are consistent with the results of the multivariate analysis of variance of posttest scores reported in the previous section.

Table 38.
Summary Table for Repeated Measures
ANOVA of Posttest Scores

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between Subjects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment (A)</td>
<td>2</td>
<td>9.9762</td>
<td>4.9881</td>
<td>19.51*</td>
</tr>
<tr>
<td>Pretest/No Pretest (B)</td>
<td>1</td>
<td>.4143</td>
<td>.4143</td>
<td>1.62</td>
</tr>
<tr>
<td>Treatment X Pretest/No Pretest (AB)</td>
<td>2</td>
<td>4.0689</td>
<td>2.0345</td>
<td>7.96**</td>
</tr>
<tr>
<td>Error (S/AB)</td>
<td>106</td>
<td>27.1005</td>
<td>.2557</td>
<td></td>
</tr>
<tr>
<td><strong>Within Subjects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of Measure (C)</td>
<td>2</td>
<td>.0447</td>
<td>.0224</td>
<td>.06</td>
</tr>
<tr>
<td>Treatment X Type of Measure (AC)</td>
<td>4</td>
<td>14.2294</td>
<td>3.5574</td>
<td>9.13*</td>
</tr>
<tr>
<td>Pretest/No Pretest X Type of Measure (BC)</td>
<td>2</td>
<td>1.4886</td>
<td>.7443</td>
<td>1.91</td>
</tr>
<tr>
<td>Treatment X Pretest/No Pretest X Type of Measure (ABC)</td>
<td>4</td>
<td>3.5010</td>
<td>.8753</td>
<td>2.25</td>
</tr>
<tr>
<td>Error (SC/AB)</td>
<td>212</td>
<td>82.6078</td>
<td>.3897</td>
<td></td>
</tr>
</tbody>
</table>

Total                     | 335 | 143.4312 |

*p<.0001. **p<.001.
The repeated measures ANOVA also yielded significance for a within-subjects factor: interaction of treatment level and type of measure (AC). In other words, the group means varied for treatment levels depending on which measure of reflectivity was used, R1, R2, or R3. Again, this finding is consistent with the previously reported MANOVA analysis wherein it was found that treatment groups were ranked differently on the three dependent variables. For example, the Reflective Teaching group scored highest on the explanatory/hypothetical discourse variable, while the augmented Reflective Teaching group scored highest on the critical discourse variable.

In summary, then, the results of the repeated measures ANOVA were consistent with the MANOVA findings reported earlier, thus lending further support to the MANOVA outcomes.

3Since the distribution for the third dependent variable, critical discourse, was not a normal distribution, the data for this variable were also analyzed using the log-linear analysis procedure. Results of the log-linear analysis indicated the same outcomes as the analysis of variance: significant main effects for the treatment level variable, with the participants in the augmented Reflective Teaching group more likely to demonstrate critical discourse than either the control group or the Reflective Teaching group.
CHAPTER V

SUMMARY AND DISCUSSION

This chapter provides a summary of the study, followed by a discussion of conclusions, implications, and recommendations based upon the results of the study.

Summary

The importance of preparing teachers who are reflective practitioners has long been acknowledged by teacher educators. A review of the literature reveals a clear consensus among teacher educators that a major goal of teacher education programs is to prepare teachers to be lifelong students of teaching. However, the literature also reveals that very little has been done to accomplish this goal. The work of Cruickshank et al. (1980) and Cruickshank (1987) seems to be the only example of a specific program directed toward that end. That program has been widely used in this decade. The question remains, however: Is the present regimen employed in that program optimal or might some variation be more useful in preparing reflective practitioners?

A review of the literature on training in teacher education (Cruickshank & Metcalf, in press) as well as a
review of the literature on reflective thinking indicated that it might be beneficial to augment Reflective Teaching with an enhanced theoretical or conceptual component. Thus a theoretical component was developed by the researcher to supplement the original Reflective Teaching regimen (see Appendix E). A quasi-experimental study was then conducted to compare the effects of participation in three different treatment conditions: (1) ordinary Reflective Teaching, (2) augmented Reflective Teaching; i.e., Reflective Teaching supplemented with a theoretical component developed by the researcher, and (3) the control group.

In addition to the primary objective of comparing the effects of participation in these three treatment conditions on preservice teachers' reflectivity in analyzing classroom teaching situations, other purposes of the study were: (1) to compare the effects of these treatment conditions on subjects' theoretical knowledge about reflection; and (2) to examine the relationship between subjects' theoretical knowledge about reflective thinking and their degree of reflectivity in analyzing classroom teaching situations.

Five hypotheses were formulated at the outset of the study. These hypotheses were based upon literature citing (1) the potential benefits of Reflective Teaching (Cruickshank, 1987; Cruickshank et al., 1981); (2) research supporting the importance of ensuring basic conceptual understanding of the skill to be learned and when and why it
is to be used (Gliessman & Pugh, 1984, 1987; Harding, 1965; Hudgins, 1974; and Kieras & Bovair, 1986); and (3) research linking conceptual awareness of reflection with increased ability to use reflective thinking in furthering personal learning, change, and growth (Boyd & Fales, 1983). The hypotheses tested in this study were:

1. Students who participate in ordinary Reflective Teaching will exhibit a greater degree of reflectivity in their analysis of classroom situations than will students who have not participated in Reflective Teaching.

2. Students who participate in augmented Reflective Teaching will exhibit a greater degree of reflectivity in their analysis of classroom situations than will students who participate in the original Reflective Teaching regimen.

3. Subjects who participate in either ordinary Reflective Teaching or augmented Reflective Teaching will exhibit a greater difference between their pretest and posttest scores than will subjects who participate in neither Reflective Teaching nor augmented Reflective Teaching.

4. Students who participate in the augmented Reflective Teaching group will score higher on the posttest of theoretical knowledge than will students in the control group or the Reflective Teaching group.

5. There will be a positive correlation between students' theoretical knowledge about reflective thinking and their degree of reflectivity in analyzing classroom teaching situations.

The research design employed to test these hypotheses was a modified form of the Solomon Four-Group Design. Seven intact sections of an undergraduate education course at the Ohio State University were assigned to the following
treatment conditions or levels: (1) Reflective Teaching, (2) augmented Reflective Teaching, and (3) the control group. At each of the first two levels, one group was pretested and one group was not. Three groups were assigned to the third or control group level; two of these groups were pretested and one was not.

The purpose of the pretest was to gain some indication of subjects' reflectivity in analyzing classroom teaching situations prior to participation in the experimental treatments. For the pretest, subjects viewed a 15-minute videotaped classroom teaching episode. In this episode, a sixth-grade teacher conducted a lesson on the topic of immigration and ancestral roots. The lesson began with a teacher-led discussion of immigration and the students' own ancestral heritage. Pupils shared their family histories related to national origin and immigration to America. Following the discussion, pupils worked on a variety of individual and small-group projects displaying information about family roots.

After subjects viewed this videotaped lesson, they were asked to spend 20 minutes reflecting on and writing an essay analyzing the teaching episode. These essays were then analyzed and scored using a modified form of Zeichner and Liston's (1985) Reflective Teaching Index.

Following the pretest, subjects participated in one of three treatment conditions. The first experimental
treatment, participation in Reflective Teaching, occurred over three consecutive days, for two hours per day. By the conclusion of the third day of Reflective Teaching, each of the subjects had been a "designated teacher," i.e., they had planned and executed one fifteen-minute small-group Reflective Teaching Lesson, assessed their learners' achievement and satisfaction upon completion of the lesson, led one ten-minute small-group discussion analyzing and reflecting on their own teaching, and participated in a large group post-lesson discussion in which the lesson they taught was considered. In addition, each subject participated as a learner in five Reflective Teaching Lessons, rated five peer teachers using the Learner Satisfaction Form, contributed to five small group discussions analyzing and reflecting on their observations of other designated teachers, and participated in five large group discussions analyzing and reflecting on their observations of other designated teachers and on perennial issues in teaching.

The second experimental treatment, augmented Reflective Teaching, included the same Reflective Teaching activities as level one, with the addition of a one and one-half hour in-class session focusing on conceptual/theoretical knowledge about reflective thinking in general and reflective teaching specifically. The content of this theoretical session focused on: (1) general descriptions
and definitions of reflection; (2) the role of reflection in the learning process, including a model by Kolb and Fry (1975); (3) cognitive processes involved in reflection; (4) outcomes and benefits of reflective thinking; (5) reasons why teachers need to be reflective about their work; (6) John Dewey’s (1933) philosophy on teachers as "students of teaching;" (7) Cruickshank’s (1985) model of reflective thinking as applied to classroom situations; and (8) Van Manen’s (1977) levels of reflectivity associated with classroom teaching. Content was selected to provide subjects with an overall conceptual understanding of the process of reflection as well as concrete knowledge about specific points to consider when reflecting on classroom teaching situations. This theoretical session occurred prior to Reflective Teaching, and students were encouraged to integrate the theoretical knowledge with the subsequent Reflective Teaching activities.

The three classes assigned to the control group participated in their regularly scheduled course activities.

At the conclusion of the treatment conditions, subjects again viewed a 15-minute videotaped classroom teaching episode. In this classroom episode, a high-school literature class discussed Edgar Allan Poe’s The Telltale Heart. The lesson began with a teacher-directed discussion of the props and characters needed to produce a play based on the short story. The discussion then turned to the
story's events, theme, and plot. After subjects viewed the videotape, they were asked to spend 20 minutes reflecting on and writing an essay analyzing the classroom teaching episode they observed. These essays were then analyzed and scored, again using a modified form of Zeichner and Liston's (1985) Reflective Teaching Index.

In addition to this posttest, a brief test of students' theoretical knowledge about reflective thinking was also administered. This brief, two-page instrument was developed by the researcher and covered theoretical knowledge about reflection in general as well as reflection in the context of classroom teaching (see Appendix H).

Thus the dependent variables for this study consisted of: (1) the theoretical posttest scores, and (2) three scores generated by the analysis of subjects' essays using the Reflective Teaching Index. These three scores represented three types of reflective discourse identified by the Reflective Teaching Index: (1) explanatory/hypothetical discourse, (2) justificatory discourse, and (3) critical discourse. These types of discourse, according to Zeichner and Liston (1985), show evidence of reflective thought, and are defined as follows. Explanatory/hypothetical discourse is characterized by attempts to identify causal relationships operating in the educational setting. Justificatory discourse entails the identification of various types of reasons and rationales underlying past,
present, or future pedagogical actions. This type of
discourse is primarily concerned with consideration of
questions of why do this, in this way, with these particular
students. Critical discourse assesses the values embedded
in the form and content of curriculum materials and
instructional practices, and assesses the adequacy of
rationales for given educational practices.

Three experienced educators with advanced degrees in
education were trained in the Reflective Teaching Index
rating procedures. The rating procedures involved a content
analysis of the pretest and posttest essays in order to
identify instances of discourse exhibiting reflective
thought. Each essay was divided into thought units. As the
thought units were identified, they were placed into the
discourse categories described in the Reflective Teaching
Index (Zeichner & Liston, 1985). The appropriate categories
for the thought units were recorded on the Reflective
Teaching Index Rating Form in the same order in which they
occurred in the essay. After all thought units were
identified, placed into categories, and recorded on the
rating form, the following scores were calculated: (1) the
percentage of total thought units falling into the
explanatory/hypothetical discourse category; (2) the
percentage of total thought units falling into the
justificatory discourse category; and (3) the percentage of
total thought units falling into the critical discourse category.

Each subject, then, had three posttest scores generated by the Reflective Teaching Index. A multivariate analysis of variance (MANOVA) of these posttest scores was performed to compare the treatment groups at the conclusion of the study. A repeated measures analysis of variance was performed on the same data to further corroborate the findings of the MANOVA. A MANOVA was also performed on the pretest scores to ascertain whether significant differences existed among the groups at the outset of the study. A third MANOVA was performed using both the pretest and posttest scores in order to determine whether treatment groups differed significantly in magnitude of change from pretest to posttest. In addition, an analysis of variance (ANOVA) was performed to examine group differences on the theoretical posttest. Finally, correlational analyses were computed to examine the relationship between students' theoretical knowledge and their reflectivity in analyzing classroom teaching situations.

Conclusions and Discussion

Hypotheses 1 - 3

Two MANOVA analyses and subsequent univariate analyses were conducted to test hypotheses one, two, and three. This section presents and summarizes the results of all these
analyses first, and then concludes with a discussion of the reported outcomes.

The first two hypotheses tested in this study predicted that there would be significant differences between treatment groups in terms of subjects' reflectivity in analyzing classroom teaching situations. It was hypothesized that participants in augmented Reflective Teaching would score highest on the Reflective Teaching Index, followed by the Reflective Teaching group, and then by the control group. The results of the multivariate analysis of variance of posttest scores supported these hypotheses.

The MANOVA analysis indicated interaction between pretesting and treatment. Post hoc analyses revealed that the interaction effects of treatment and pretesting were most evident for augmented Reflective Teaching. At this level, subjects who were pretested scored significantly higher than subjects who were not pretested. One possible explanation for this is that the pretest in some way prepared the students to better understand the theoretical component of their treatment activities. Perhaps the pretest activity of trying to analyze a classroom teaching situation helped subjects to better understand and assimilate the theoretical notions that were presented during their treatment activities. In other words, students could relate the ideas presented in the theoretical lecture
to a recent, concrete experience with thinking reflectively about a classroom situation.

Since interaction effects were ordinal in nature, the main effects for the treatment level variable were examined. Analysis of main effects for treatment level revealed that the three treatment groups all differed significantly from each other. The augmented Reflective Teaching group scored significantly higher than both the Reflective Teaching group and the control group. The Reflective Teaching group also scored significantly higher than the control group. Thus, when all three dependent variables were analyzed simultaneously (multivariate analysis), the first two hypotheses were supported.

When the three dependent variables were analyzed separately in a follow-up univariate analysis, however, a more complex picture of the results emerged. For the first dependent variable, explanatory/hypothetical discourse, the Reflective Teaching group and the augmented Reflective Teaching group both scored higher than the control group, but did not differ significantly from each other. For the second dependent variable, justificatory discourse, the augmented Reflective Teaching group scored highest under the condition of pretesting, but the Reflective Teaching group scored highest under the no-pretest condition. For the third dependent variable, critical discourse, the augmented Reflective Teaching group scored significantly higher than
both the control group and the Reflective Teaching group. In addition, the control group scored significantly higher than the Reflective Teaching group on the critical discourse variable. Thus the three treatment groups varied in their rankings for the three dependent variables.

In summarizing these results, it seems that the Reflective Teaching regimen had the greatest positive effect on the explanatory/hypothetical variable, while the augmented Reflective Teaching regimen had the greatest positive effect on the critical discourse variable. For the justificatory discourse variable, the Reflective Teaching regimen had the greater effect under conditions of no pretesting, while the augmented Reflective Teaching regimen had the greater effect when combined with pretesting.

Thus the univariate analysis lent partial support to hypotheses one and two. Hypothesis one (i.e., Subjects who participate in Reflective Teaching will exhibit a greater degree of reflectivity in their analysis of classroom situations than will subjects who have not participated in Reflective Teaching) was supported for explanatory/hypothetical discourse, but not for critical discourse. Hypothesis two (i.e., Subjects who participate in augmented Reflective Teaching will exhibit a greater degree of reflectivity in their analysis of classroom situations than will students who participate in the original Reflective Teaching regimen) was supported for justificatory discourse
and critical discourse, but not for explanatory/hypothetical discourse.

Another MANOVA analysis was computed on the pretest and posttest scores to test hypothesis three. This hypothesis predicted that the Reflective Teaching group and the augmented Reflective Teaching group would exhibit greater differences between their pretest and posttest scores than would the control group. Results of both the multivariate analysis and subsequent univariate analyses supported hypothesis three and also supported the results of the first MANOVA. The Reflective Teaching group showed a statistically significant change from the pretest to the posttest on only one dependent variable, explanatory/hypothetical discourse. The augmented Reflective Teaching group, on the other hand, showed a statistically significant increase from the pretest to the posttest on all three dependent variables: explanatory/hypothetical discourse, justificatory discourse, and critical discourse. The control group showed no statistically significant increases from the pretest to the posttest on any of the dependent variables.

Based on the results of these analyses, it can be concluded that the treatment conditions administered in this study have a differential effect on preservice teachers' reflectivity in analyzing classroom teaching situations. The Reflective Teaching regimen as originally designed
appears to have a greater effect on explanatory/hypothetical discourse than it does on either justificatory or critical discourse. The augmented Reflective Teaching regimen appears to have a positive effect on all three types of reflective discourse, with the greatest impact on the critical discourse variable. The control group's participation in the traditional activities of a typical introductory education course did not appear to promote reflectivity in analyzing classroom teaching situations.

In an effort to determine why these differential outcomes occurred, the two experimental treatments were examined and compared. In the Reflective Teaching regimen, the questions for small and large group discussion utilized in the reflective sessions appear to emphasize the types of thinking that can be categorized as explanatory/hypothetical. While questions are also included related to the assessment of values, assumptions, and beliefs (critical discourse), they: (1) are relatively few in number, (2) appear toward the end of each list of questions, and (3) are phrased in general terms that may not lead students to a critical appraisal of their own biases and assumptions (e.g., "What do you believe about teaching?" "Do you believe you changed any of your ideas about teaching or attitudes toward teaching?"). Thus participants following the list of discussion questions sequentially may not have time to discuss the questions related to beliefs and values.
In addition, critically appraising one's own biases and assumptions is a difficult task -- undergraduates may simply discuss these questions at a superficial level unless further guidance is given.

Of course, the nature of the discussion in the reflective sessions is heavily dependent on the designated teachers, who serve as small-group discussion leaders, and on the college instructors, who serve as large-group discussion leaders. The instructor's own biases and preferences come into play here, and he or she may lead the discussion in any direction he/she chooses. If the discussion questions included with the Reflective Teaching materials are followed fairly closely, however, resultant discussions would focus most heavily on types of thinking that can be categorized as explanatory/hypothetical, with much less emphasis on the types of thinking encompassed in the critical discourse variable. One limitation of this study is that the actual small and large group discussions occurring in the reflective sessions were not examined to determine the nature of the discourse occurring in the discussions. Thus, while it appears likely that the Reflective Teaching regimen emphasizes explanatory/hypothetical discourse, this study did not gather data to verify that emphasis.

The augmented Reflective Teaching regimen used the same discussion questions, but in addition incorporated a
theoretical session prior to the Reflective Teaching activities. In this theoretical session, extensive consideration was given to all three of Van Manen's (1977) levels of reflectivity. Thus participants discussed and practiced critical reflection and analysis of the assumptions and biases underlying educational practices.

In comparing the two experimental treatments, then, it is apparent that the augmented Reflective Teaching group received more extensive and direct practice with all three types of reflective thinking, while the Reflective Teaching regimen appeared to emphasize the types of thinking categorized as explanatory/hypothetical. Thus the outcomes of this study are not unexpected when juxtaposed with the content and activities of the experimental treatments.

**Hypotheses 4 - 5**

Hypotheses four and five predicted that there would be significant differences among treatment groups in terms of their theoretical knowledge about reflection, and that this theoretical knowledge would be positively correlated with subjects' reflectivity in analyzing classroom teaching situations.

Statistical analysis of theoretical posttest scores indicated that treatment groups did indeed differ significantly in regard to subjects' theoretical knowledge about the processes and outcomes of reflection. The
augmented Reflective Teaching group scored significantly higher than both the Reflective Teaching group and the control group on the theoretical posttest. In addition, the Reflective Teaching group and the control group did not differ significantly on their theoretical posttest scores. Based on these results, it can be concluded that the theoretical component administered as part of the level two treatment conditions was effective in teaching theoretical knowledge about the processes and outcomes of reflective thinking. It can also be concluded that simply participating in the Reflective Teaching regimen did not increase subjects' theoretical understanding of the processes and outcomes of reflection. Finally, based upon the low theoretical posttest scores of subjects in the control group and the Reflective Teaching group, it can be concluded that preservice teachers do not acquire this theoretical knowledge in other parts of the teacher education program at The Ohio State University.

Statistical analysis also indicated that there is a moderate positive correlation between subjects' theoretical posttest scores and their reflectivity in analyzing classroom teaching situations. This finding supports the conclusion drawn by Boyd and Fales (1983) that once individuals become more aware of the processes and outcomes of reflective thinking, they are better able to use it intentionally in their own learning, change, and growth. It
also supports Boud, Keogh, and Walker's (1985) theory that it is useful for teachers to have a model of reflection pointing to some of the major processes which they should consider, and for them to have their attention drawn to the importance of reflective thinking.

Summary and Discussion

Two major conclusions are supported by the statistical analyses conducted in this study. First, Reflective Teaching is effective in enhancing preservice teachers' reflectivity in analyzing classroom teaching situations. This conclusion contradicts Gore's contention that "features of the Reflective Teaching approach appear to hinder the achievement of its own aims, that is, the development of teachers who are reflective" (p. 35). Rather than hindering the development of reflective teachers, this study indicates that Reflective Teaching promotes teacher reflection. It also concurs with the findings of an earlier study that Reflective Teaching does have an impact on the quality of preservice teachers' thinking about classroom teaching. This study, conducted by Cruickshank, Kennedy, Williams, Holton, and Fay (1981) gave partial support to the hypothesis that participation in Reflective Teaching promotes students' ability to think and express themselves in a complex manner. Based on the results of these two studies, it would seem that participation in Reflective
Teaching does indeed have an impact on the way in which preservice teachers think about classroom teaching.

A second conclusion drawn from this study is that supplementing the Reflective Teaching regimen with a theoretical component on the processes and outcomes of reflective thinking results in an even more effective regimen for preparing reflective teachers. This conclusion concurs with Joyce and Showers (1983) and Tillema and Veenman's (1987) recommendation that training regimens include an explanation of theory as well as opportunities for practice. It also concurs with other research supporting the importance of ensuring basic conceptual understanding of the skill to be learned and when and why it is to be used (Gliessman & Pugh, 1984, 1987; Harding, 1965; Hudgins, 1974; Kieras & Bovair, 1986). This conclusion also concurs with Boyd and Fales's (1983) theory that once individuals understand the processes and outcomes of reflective thinking, they are better able to use it intentionally in their own learning and growth. Thus, the conclusions of this study, other research, and the related theoretical literature all point to the potential benefits of supplementing Reflective Teaching with a theoretical component.
Implications

The instructional implications of this study’s outcomes are rather straightforward. If a goal of teacher education programs is to prepare reflective teachers, then the Reflective Teaching regimen is an instructional strategy that can be used to help achieve that goal. In addition, supplementing the Reflective Teaching regimen with theoretical knowledge about the processes and outcomes of reflective thinking is beneficial in achieving the goal of preparing reflective practitioners. Thus teacher educators interested in preparing reflective practitioners would be well-advised to consider incorporating these instructional units into the preservice teacher education program.

Recommendations for Further Research

The following studies are recommended for future research:

1. Research that would describe and analyze the behavior of participants during Reflective Teaching in order to gain insights into its processes and benefits.
2. Research that would examine the nature of the discourse occurring during the small and large group discussions in Reflective Teaching.

3. Research that would focus on describing and analyzing the college instructor's role during Reflective Teaching, including the instructor's impact on the processes and outcomes of Reflective Teaching.

4. A replication of this study as a true experiment with random assignment of subjects to groups.

5. Further research into refining and developing measurement instruments used to assess reflectivity.

6. Longitudinal studies that would investigate preservice teachers' ability and propensity to reflect on teaching throughout their preservice training and into the first few years of teaching.
APPENDIX A

REFLECTIVE TEACHING LESSONS
THE VOCABULARY TASK*

Read each section carefully

Description of your Reflective Teaching task
You are one of several members of the class chosen to teach this short lesson to a small group of your classmates. Plan to teach it in such a way that you believe both student learning and satisfaction will result.

Your lesson will be taught on ____________________________.

Introduction to the lesson
Teachers designate things—that is they denote things directly and specifically for learners. Teachers also describe things—that is they tell about something. The following are examples of teacher designating and describing behavior:

1. An elementary teacher designates the planets in the solar system and describes the topographic and atmospheric conditions of each.
2. An agriculture teacher designates the parts of a small engine and describes the functions of each part.
3. A home economics teacher designates what a calorie is and describes how the calorie count of foods is determined.

Below is an objective that requires you to designate and describe something to a small group of your peers. The task was selected because your success in accomplishing it probably will not be dependent on your knowledge of some academic subject or previous experience you might have had.

Your objective
Your goal is to get as many of your learners as possible to be able to identify correctly synonyms of 10 vocabulary words. You will have 15 minutes in which to accomplish your goal.

Materials
1. Vocabulary (attached)
2. Test (provided by college instructor)
3. Answer sheet and scoring box (provided by college instructor)
4. Learner satisfaction forms (provided by college instructor)

Special conditions and limitations
You will not be given a copy of the test until after you have taught your lesson.

Ending the lesson
Notify the college instructor when your learners are ready to take the test. (You may finish early.) Obtain copies of the test, answer sheet and scoring box, and learner satisfaction form. Give your learners the test, and when they have finished (no more than three minutes), read them the correct answers so that they can correct their own tests. Use the criteria with the scoring box for scoring.

Next, pass out the learner satisfaction forms, and while they are being completed, collect the tests and record the scores in the scoring box. Return the tests and collect the learner satisfaction forms.

Begin to work through the questions for small group discussion with your learners.

*The idea for this RTT was contributed by Donald R. Cruickshank, The Ohio State University.
VOCABULARY

1. proselyte
2. abstemious
3. perambulator
4. lachrymose
5. scabbard
6. sagacious
7. chimerical
8. sobriquet
9. jejun
10. comestible
TEST
THE VOCABULARY TEST

Name ____________________

1. chimerical
   A. accidental       B. imaginary       C. chameleon-like       D. dianthus

2. jejuné
   A. hearty drink     B. margin         C. dull                  D. sweet

3. scabbard
   A. sheath           B. shekel         C. drunkard             D. wound

4. perambulator
   A. bathtub          B. ambulance      C. baby carriage        D. pericope

5. proselytise
   A. to sing          B. exonerate      C. loath                D. convert

6. sobriquet
   A. nickname         B. bequeath       C. serious              D. social

7. sagacious
   A. shrewd           B. mischievous    C. lively               D. lethargic

8. lachrymose
   A. boastful         B. tearful        C. gloomy               D. aimless

9. comestible
   A. combustible      B. pliable        C. weak                 D. edible

10. abstemious
    A. aggregate        B. parsimonious   C. crepusculous         D. disrepute
ANSWER SHEET
THE VOCABULARY TASK

1. B       6. A
2. C       7. A
3. A       8. B
5. D       10. B

SCORING BOX

Directions
Give each learner 1 point for each correct answer.

<table>
<thead>
<tr>
<th>Learner's Name</th>
<th>Total correct answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
</tr>
<tr>
<td>TOTAL (add down)</td>
<td></td>
</tr>
</tbody>
</table>
Reflective Teaching Lesson 10*  

The Origami Task  
(Practicing Demonstrating Behavior)

Description of your Reflective Teaching task

You are one of several members of your class chosen to teach this short lesson to a small group of your classmates. Plan to teach it in a way that you believe both student achievement and satisfaction will result.

Your lesson will be taught on__________________.

Introduction to the lesson

Teachers demonstrate— that is they show learners how to do something. The following are examples of teacher demonstrating behavior.

1. A health education teacher demonstrates how to give mouth-to-mouth resuscitation.
2. A physics teacher demonstrates the phenomenon of centrifugal force.
3. A social studies teacher engages the class in a demonstration of how a bill becomes a law.
4. A home economics teacher demonstrates the proper way to bath an infant.

Below is an objective that requires you to demonstrate something to a small group of your peers. The task was selected because your success in accomplishing it probably will not be dependent on your knowledge of some academic subject or previous experience you might have had.

Your objective

Your goal is to get as many of your learners as possible to make a butterfly from paper using the technique of origami. You will have fifteen minutes in which to accomplish your goal.

Materials

1. "Origami, etc." (attached)
2. Scoring box
3. Learner Satisfaction Forms

*The idea for this RTL was contributed by Dr. Jerry Hager, Syracuse University.
Special conditions and limitations

The teacher may not touch or fold a learner's paper.

Ending the lesson

1. Notify the college instructor as soon as all your learners have completed the task successfully. The instructor will record the time.
2. Obtain copies of the Learner Satisfaction Forms from the college instructor.
3. Distribute the forms to the learners advising them that they will have two minutes to complete them.
4. While the learners complete the forms, grade each butterfly according to the following criteria:
   - 3 if excellent
   - 2 if satisfactory
   - 1 if unsatisfactory
5. Record the scores in the attached Scoring Box.
6. Collect the Learner Satisfaction Forms and tell the learners their scores.
Origami is the Japanese art of paper folding.

**THE BUTTERFLY**

```
1
2

3
4

Turn over
```
Scoring Box RTL #10

The Origami Task

<table>
<thead>
<tr>
<th>Learner's Name</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
</tr>
</tbody>
</table>

Average Score
THE MAGIC SQUARE TASK*

Read each section carefully

Description of your Reflective Teaching task
You are one of several members of the class chosen to teach this short lesson to a small group of your classmates. Plan to teach it in such a way that you believe both student learning and satisfaction will result.

Your lesson will be taught on _____________________________

Introduction to the lesson
Teachers describe—that is they tell about something. Teachers also demonstrate—that is they show how to do something. The following are examples of teacher describing and demonstrating behavior.

(1) An elementary teacher describes how to perform division and demonstrates by example.
(2) A chemistry teacher describes how to prepare a solution and demonstrates by example.
(3) An auto mechanics teacher describes how to change a tire and demonstrates by example.
(4) A physical education teacher describes how to do a forward roll and demonstrates by example.

Below is an objective that requires you to describe and demonstrate something to a small group of your peers. The task was selected because your success in accomplishing it probably will not be dependent on your knowledge of some academic subject or previous experience you might have had.

Your objective
Your goal is to get as many of your learners as possible to be able to correctly construct a magic square where the number of cells on each side equals seven. You will have 15 minutes in which to accomplish your objective.

Materials
(1) Magic squares (attached)
(2) Test (provided by college instructor)
(3) Scoring box (provided by college instructor)
(4) Learner satisfaction forms (provided by college instructor)

Special conditions and limitations
None.

Ending the lesson
Notify the college instructor when your learners are ready to take the test. (You may finish early.) Obtain copies of the test, scoring box, and learner satisfaction form. Give your learners the test, and when they have finished (no more than five minutes), read them the correct answers so that they can correct their own tests. Use the criteria given with the scoring box for scoring.

Next, pass out the learner satisfaction forms, and while they are being completed, collect the tests and record the scores in the scoring box. Return the tests and collect the learner satisfaction forms.

Begin to work through the questions for small group discussion with your learners.

*The idea for this RTL was contributed by Donald R. Cruickshank, The Ohio State University.
MAGIC SQUARES

A magic square is one in which the columns, rows, and diagonals all add to the same number. For example, in the square below they all add to 15.

\[
\begin{array}{ccc}
15 & 15 & 15 \\
15 & 15 & 15 \\
15 & 15 & 15 \\
\end{array}
\]

\[
\begin{array}{ccc}
8 & 1 & 6 \\
3 & 5 & 7 \\
4 & 9 & 2 \\
\end{array}
\]

The formation of magic squares has been an amusement for centuries. They were sometimes said to possess magical properties; one particular square was inscribed on a silver plate and carried as a protection against the plague.

Magic squares can be constructed by trial and error, but the task is very time consuming. Thanks to a rule discovered by De La Loubere in 1693, it is possible to complete odd-numbered squares with ease. There are formulas for even-numbered squares, but they will not concern us at this stage.

De La Loubere's rule may be stated as follows:

(a) Place the numeral 1 in the middle cell of the top row.

(b) Then proceed to place the successive numbers moving upwards diagonally to the right. However, if the top row is reached, one moves to the bottom row as if it had been above the top row. Thus 2 goes to the bottom right-hand corner.

\[
\begin{array}{ccc}
1 & & \\
& & \\
& & \\
\end{array}
\]

\[
\begin{array}{ccc}
& & \\
2 & & \\
& & \\
\end{array}
\]

(c) If the right-hand column is reached, one moves to the left-hand column as if it had been next to the right-hand column.

\[
\begin{array}{ccc}
& & \\
& & \\
3 & & \\
\end{array}
\]

\[
\begin{array}{ccc}
& & \\
& & \\
& & \\
\end{array}
\]

Thus 3 goes to the middle left-hand cell.
(d) If, when moving diagonally, one finds another number filling a cell, then move to the cell immediately below.

Thus 4 goes below the 3.

(e) When the top right corner cell is reached, place the next number directly below.

Thus 7 goes below the 6.

Now the right column is reached, so the 8 goes in the left column.

This reaches the top line, so the 9 goes in the bottom row.

The following summarizes the rules:
Finally: When any cell is full, go directly below where the last number was placed.

Let us now apply the rule to a 5-cell square

<table>
<thead>
<tr>
<th></th>
<th>17</th>
<th>24</th>
<th>1</th>
<th>8</th>
<th>15</th>
<th>65</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>5</td>
<td>7</td>
<td>14</td>
<td>16</td>
<td></td>
<td>65</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>13</td>
<td>20</td>
<td>22</td>
<td></td>
<td>65</td>
</tr>
<tr>
<td>10</td>
<td>12</td>
<td>19</td>
<td>21</td>
<td>3</td>
<td></td>
<td>65</td>
</tr>
<tr>
<td>11</td>
<td>18</td>
<td>25</td>
<td>2</td>
<td>9</td>
<td></td>
<td>65</td>
</tr>
</tbody>
</table>

All rows, columns, and diagonals add to 65.
Name ____________________

The square below has an odd number of cells on each side. Use the rules you have been given to construct a magic square.
ANSWER SHEET
THE MAGIC SQUARE TASK

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>39</th>
<th>48</th>
<th>1</th>
<th>10</th>
<th>19</th>
<th>28</th>
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<td>38</td>
<td>47</td>
<td>7</td>
<td>9</td>
<td>18</td>
<td>27</td>
<td>29</td>
</tr>
<tr>
<td>38</td>
<td>46</td>
<td>6</td>
<td>8</td>
<td>17</td>
<td>26</td>
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<td>23</td>
<td>32</td>
<td>41</td>
<td>43</td>
<td>3</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>31</td>
<td>40</td>
<td>49</td>
<td>2</td>
<td>11</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

SCORING BOX

Directions
Give each learner 1 point for each number in the correct box. A perfect test score would be 49.

<table>
<thead>
<tr>
<th>Learner's Name</th>
<th>Performance Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
</tr>
</tbody>
</table>

Group Average
(add learners' scores and divide by number of learners)
THE JOHN DEWEY TASK*

Read each section carefully

Description of your Reflective Teaching task

You are one of several members of the class chosen to teach this short lesson to a small group of your classmates. Plan to teach it in such a way that you believe both student learning and satisfaction will result.

Your lesson will be taught on ____________________________

Introduction to the lesson

Teachers describe events and facts to show the development of something. Following are some specific examples:

(1) A teacher uses the format of a story problem to engage youngsters in problem solving.
(2) The librarian tells youngsters a story of Abraham Lincoln’s early life.
(3) A religious education teacher tells youngsters a story to illustrate how the laws of the religion were obtained.
(4) A teacher tells a story to teach youngsters the consequences of different behaviors.

Below is an objective that requires you to describe something to a small group of your peers. The task was selected because your success in accomplishing it probably will not be dependent on your knowledge of some academic subject or previous experience you might have had.

Your objective

Your goal is to get as many of your learners as possible to correctly answer five test questions on John Dewey. The questions will be multiple choice and will focus on: (a) something Dewey might have said in his later years; (b) a change in Dewey’s ideas as he grew older; (c) an influence on Dewey to become more socially conscious; (d) Dewey’s ideas about how education should occur; and (e) his probable stance on a modern political issue. You will have 15 minutes in which to accomplish your goal.

Materials

(1) John Dewey Task information (attached)
(2) Test (provided by college instructor)
(3) Answer sheet and scoring box (provided by college instructor)
(4) Learner satisfaction forms (provided by college instructor)

Special conditions and limitations

Students may not see or read the article on John Dewey that is attached.

Ending the lesson

Notify the college instructor when your learners are ready to take the test. (You may finish early.) Obtain copies of the test, answer sheet and scoring box, and learner satisfaction form. Give your learners the test, and when they have finished (no more than three minutes), read them the correct answer so that they can correct their own tests. Use the criteria given with the scoring box for scoring.

Next, pass out the learner satisfaction forms, and while they are being completed, collect the tests and record the scores in the scoring box. Return the tests and collect the learner satisfaction forms.

Begin to work through the questions for small group discussion with your learners.

*The idea for this RTL was contributed by David Clasefehr, Jonathan Alder High School, Plain City, Ohio.
JOHN DEWEY TASK INFORMATION

John Dewey (1859-1952). If any one name is to be associated with American education and American philosophy, it would be John Dewey's. Not only did his lifespan of nearly 100 years coincide with the transition of America from a primarily rural and Jeffersonian democracy to an enormously powerful and wealthy urban superpower, but Dewey himself made a contribution to America's changing conception of itself and of its institutions—in politics, philosophy, and in education.

Dewey was born in Burlington, Vermont, in October of 1859, the son of a storekeeper and his wife. Dewey attended the local schools like other children, but unlike most of his contemporaries, he continued his education attending both high school and college. College in Dewey's time was a different experience than it is today. Except for Oberlin College in Ohio and until later in the century, nearly all the students in all of the colleges in the United States were men. Instead of the many different courses available, the curriculum was much narrower (although it should be understood that the narrower curriculum did not mean that students were necessarily short-changed or that they did not receive a very good education in the best colleges of the day). Apparently Dewey profited particularly during his last year at the University of Vermont in the course that was meant to be the traditional culmination of the 19th century college education—a course often called "Moral Philosophy." In this course, a distinguished professor (often the president of the college) would lead the senior men through a basic introduction to religious, philosophical, economic, and political theories of the Western world. Students read, discussed, and wrote about the great thinkers and poets during this course that lasted the whole senior year.

Dewey found this senior year experience stimulating. It helped to consolidate a growing interest in the things of the mind—an interest that had been encouraged and nurtured by his parents.

An educated man—one who had graduated from college—had only a few outlets for his training in those days when most people had little more than a grade school education. He could set himself up for a gentleman if he had a wealthy father; he could go into one of the two professions of law or medicine; he could become a minister if he felt the call; or he could become a teacher in high school or college. Dewey chose the last, and for three years taught in a high school. Again, the reader should recall that high school in Dewey's day was much different from that of today. Attended by just a few of the young people of the community, the high school curriculum was aimed at preparing children for the genteel life, whose parents could afford to spare them from early entry into the work force.

Dewey's tastes had been whetted however, and three years in a high school was enough for him. In 1882, John went off to Baltimore to attend the new university, Johns Hopkins. Johns Hopkins was a new kind of university because it offered graduate degrees like the Ph.D. (the highest degree previously available in the United States was the M.A. which was largely an honorary degree). At Johns Hopkins, Dewey found himself immersed in an intellectually rich environment, one that gave him a framework, or foundation, on which to build his own, as yet somewhat disorganized, thought. He was particularly taken by the Neo-Hegelianism of Professor George Sylvester Morris. Neo-Hegelianism was based on the work of George Wilhelm Friedrich Hegel (1770-1831), the great German philosopher. The emphasis which Neo-Hegelianism placed upon the organic and spiritual nature of the universe (that is, that the universe is not a cold and mechanistic place, but one in which the elements—including human beings—are organically related and in which spiritual values are real) was very attractive to Dewey.

In 1884, Dewey took his Ph.D. and went off to the University of Michigan as an instructor in philosophy and psychology. These two subjects were often linked in those days because psychology had come into being as an outgrowth of philosophy. During the next 10 years, Dewey continued his studies in philosophy and became interested as well in the new experimental psychology that was tending to take psychology out of the realm of philosophy and was modeling itself more on the pattern of the physical sciences. It was during these years that Dewey became interested in the study of education. He began to realize that American schools were far from
meeting the old ideal of educating children to their greatest potential so that they could be contributing members of the American democracy. His studies in psychology also showed that in many ways schools were conducted contrary to what was being discovered about the ways that children learned and grew. Education also intrigued Dewey because it seemed to be an area where philosophy had application in the world of human action.

In 1886 Dewey married Harriet Alice Chapman who had been a student of his at Michigan. The new Mrs. Dewey was herself a bright and intelligent person, and her concern for the problems of social justice and the related problems of education stimulated Dewey's interests in these areas.

In 1894 Dewey joined the faculty of the new University of Chicago (it had been founded in 1892). Backed by the huge resources of John D. Rockefeller and driven by the incredible energy and talent of its first president, William Rainey Harper, the new university had already become a major institution of higher education in the United States. Harper had recruited a very able faculty and it was a mark of recognition that he had asked Dewey to join it. Dewey was professor and chairman of the department of philosophy, psychology, and pedagogy. Dewey was attracted by the departmental arrangement that grouped pedagogy (the science and art of teaching) with philosophy and psychology because he saw it as desirable for pedagogy to be nurtured by the other two studies.

The department under Dewey was intellectually active and came to world fame as the Chicago school of philosophy after the publication in 1903 of Studies in Logical Theory written by Dewey and several of his colleagues at Chicago. In addition to fame in philosophy, Dewey's department made many contributions to the field of psychology. The perspective taken in this area was to investigate the total living organism and its relation with its environment. In particular, the psychological investigations centered on how the organism adjusted itself to the changes which took place in that environment. This perspective is one development of the whole field of what is called "functional psychology."

In the third area under the department, pedagogy, Dewey and his colleagues also made striking contributions. Education in Chicago at the time when Dewey was at the University was fraught with controversy. Chicago with its booming industry and its large immigrant population made some educators (like Col. Francis Parker, head of the Cook County Normal School) wonder if the older notions of education that served in the older, rural America, were not out-of-date. One of the things that Dewey had accomplished during his years at Chicago was the establishment of a University Elementary School on campus. The school had originally been founded by Col. Parker for Mrs. Emmons Blaine (who was the daughter of Cyrus McCormick, the man who had invented the mechanical reaper). The school had been named the Chicago Institute. Mrs. Blaine and Col. Parker had been persuaded to incorporate the school as a part of the University of Chicago in 1901. Thus Dewey and his colleagues had a laboratory school in which they could apply findings about human learning discovered in psychology and suggested by the Chicago school of philosophy. In a report about the University Elementary School (which was the new name of the Chicago Institute), Dewey indicated that there were four principal problems to be faced before the basic principles and practices of the school could be established:

1. How can a school be brought into closer relation with the home and community in which it is established? How can a school be more than just a place where children come simply to learn certain lessons?
2. How can the subject matter traditionally taught in schools be made to have truly positive influences on the lives of the children?
3. How can the formal and symbolic subjects (reading, writing, and counting) be taught so that their relationship with everyday life becomes clear? How can they be taught so that children will see the relation between them and those subjects which appeal to children on their own account?
4. How can children be treated as individuals and truly be given individual attention?

Here briefly were the answers Dewey and his colleagues gave to these questions:

First, the school can be brought into closer relation with the home and community by showing how the school itself is in fact a community. In older, preindustrial societies, the child was active
in the community of adults—for example, farm children took part in the work of the farm and so made a positive contribution to the family and the community—and learned their adult roles by such participation. However, in the newer industrial society, children had little chance to learn adult roles. This could be seen in the fact that factory workers worked away from home at unskilled jobs that required almost no training. The children of factory workers were either left to fend for themselves on the streets or were put to the same kind of mind-numbing factory labor as their parents. Dewey thought that the school should take over the former role of the family. At school children would learn the habits of cooperation and the skills of adult life. Therefore, the school emphasized the various home activities like handicrafts, cooking and sewing, and attempted to relate these activities to the more traditional subject matter areas taught in traditional schools. For instance, the natural interest young children might have in cooking could be extended to show them how grain is grown, milled into flour, and then distributed to stores. Thus, growing out of the activity of cooking, children could see and learn about a great number of activities of human life.

Second, subject matter that Dewey saw as being introduced abstractly could be taught more effectively (thereby having a genuine effect on the child’s life) if the child’s interests were used to energize the lesson. It is sometimes suggested that Dewey’s philosophy of education was ‘child-centered’ as a result of this emphasis on the child’s interests. In fact, Dewey felt that it was just as foolish to concentrate wholly on the child’s own interests as it was to wholly ignore them. There should be a balance between the interest of the child and the subject matter. This balancing is largely the task of the teacher who must know both the subject matter and the interests of the child and be able to lead the child through his or her own interests to the subject matter. In this way the subjects the child learned could have a genuine impact on the child’s life.

Third, Dewey recognized that teaching the abstract and symbolic subjects (reading, writing, and using numbers) posed special problems for the teacher. He met these problems as he met the problem of curriculum; he attempted to teach these subjects by using the child’s own interests. The teacher needs to help the child see the connection between everyday life and abstract and symbolic subjects.

Finally, the problem of giving individual attention to individual students remains as difficult a problem now as it was in Dewey’s day. Part of the solution, of course, was providing enough resources so that children in schools did not need to be treated as a nameless mass—for example, there should be money enough to hire enough teachers so that classes could be small. Dewey also suggested that if the school was truly a democratic community, the interests of the individual and the interests of the community coincide. This means that the children individually need to have a role in the planning and in the execution of the activities of the class.

In addition to his work with the practical aspects of having a real school in which to try out notions about psychology and philosophy, Dewey also concerned himself with the practical social life of Chicago. Dewey was interested in Jane Addams’s neighborhood settlement house, Hull House. He formed a warm friendship with Jane Addams and worked for legislation to help the underprivileged.

In 1904 Dewey came into conflict with President Harper over the administration of the University Elementary School and resigned. He then accepted a post as professor of philosophy at Columbia University in New York City. For nearly the next half century Dewey was connected with Columbia. It was here that his fame, both as a philosopher and as a person, vitally involved with the social, political, and intellectual life of the United States grew. His classes at Columbia attracted students from around the world. He wrote prodigiously on a wide range of subjects—art, theory of knowledge, education, and religion. In addition to scholarly publications, Dewey regularly wrote for journals of general interest like the New Republic and became famous for his commentaries on the social and political issues of the day.

His interest in the controversies of the day was not limited to thinking and writing about them. He also took an active role in organizations that were directed at reforming various aspects of American life. He was one of the founders of the American Association of University Professors that became a strong force promoting academic freedom on college campuses. He was part of the
movement that pressed for the Kellogg-Briand Pact of 1925 that was an attempt to outlaw war. He worked to help professors from exiled totalitarian Europe find refuge in the United States. He tried to found a new political party that would address itself to solving the problems caused by the Great Depression, 1929–41.

Dewey enjoyed generally good health and was active and intellectually sharp even into his early 90s. In 1951, Dewey broke his hip; he died June 1, 1952.
TEST
THE JOHN DEWEY TASK

Name ________________________

1. Which of the following best represents something Dewey might have said in his later years?
   (a) There is an Absolute Mind manifesting itself in the universe.
   (b) The universe is determined by its spiritual nature.
   (c) We find meaning in life in the here and now.
   (d) It is through the dialectic of ideas that the world is revealed.

2. Which of the following best represents the change in Dewey's ideas as he grew older?
   (a) a change from social life including reading to a loss of social life and total time devoted to reading
   (b) a belief in Neo-Hegelian theory of ideas in earlier life was replaced by an instrumentalist theory of knowledge
   (c) a belief in Neo-Hegelian theory of ideas was replaced by an existentialist theory of ideas
   (d) a pragmatic theory of ideas was replaced by an existentialist theory of ideas

3. Which of the following probably influenced Dewey to become more socially conscious?
   (a) the effects of World War I
   (b) the influence of Mrs. Alice Dewey (his first wife)
   (c) the rise of communism
   (d) the influence of George Sylvester Morris

4. Which of the following best represents the way education should occur according to Dewey?
   (a) classroom should be open, teacher directed, and must begin with the interests of the child
   (b) the classroom should be open or take place out-of-doors, should work toward growth of the total child, and should include a prescribed curriculum
   (c) the teacher should be a guide and coworker with the child, teaching should build upon the interests of the child, and the school should be a miniature community
   (d) the child should be an independent learner, the teacher should be a resource person, and the school be organized as a miniature community

5. Politically, Dewey would probably support which of the following?
   (a) big business needs government support to decrease inflation
   (b) public employees should not have the right to strike
   (c) Anita Bryant's campaign against homosexuals as teachers
   (d) a petition in favor of welfare rights
1. c
2. b
3. b
4. c
5. d

SCORING BOX

Directions
Place a + in the box if the question was answered correctly or a zero if it was not.

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<th>Learner's Name</th>
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TOTAL (add down)
THE GOOD TEACHER TASK

Read each section carefully

Description of your Reflective Teaching task
You are one of several members of the class chosen to teach this short lesson to a small group of your classmates. Plan to teach it in such a way that you believe both student learning and satisfaction will result.

Your lesson will be taught on ________________

Introduction to the lesson
Teachers designate things—that is they denote things directly and specifically for learners. The following are examples of teacher designating behavior:

1. A foreign language teacher tells students the names of the German prepositions which always take indirect objects.
2. A chemistry teacher tells students the names of all the elements of the periodic table which are inert gases.
3. A health education teacher tells students names of the classes of foods.
4. A geography teacher tells students the names of the world’s five highest mountains.
5. A math teacher tells students names of all the prime numbers between one and twenty.

Below is an objective that requires you to designate something to a group of your peers. The task was selected because your success in accomplishing it probably will not be dependent on your knowledge of some academic subject or previous experience you might have had.

Your objective
Your goal is to get as many of your learners as possible to name and correctly order 11 teacher behaviors identified as showing the greatest relationship to student achievement. You will have 15 minutes in which to accomplish your goal.

Materials
1. Information sheet on teacher behaviors related to student achievement (attached)
2. Test (attached)
3. Learner satisfaction forms (provided by college instructor)
4. Scoring box (attached)

Special conditions and limitations
None.

Ending the lesson
Notify the college instructor when your learners are ready to take the test. (You may finish early.) Obtain copies of the learner satisfaction form. Give your learners the test and when they have finished (no more than three minutes), read them the correct answer so that they can correct their own tests. Use the criteria given with the scoring box for scoring.

Next, pass out the learner satisfaction forms, and while they are being completed, collect the tests and record the scores in the scoring box. Return the tests and collect the learner satisfaction forms.

Begin to work through the questions for small group discussion with your learners.
INFORMATION SHEET ON TEACHER BEHAVIORS RELATED TO STUDENT ACHIEVEMENT

From a review of more than 50 research studies which had investigated the teacher behaviors that appeared to have the strongest relationship to student achievement, Rosenshine and Furst identified 11 behaviors. These are listed in order from the strongest relationship to the weakest relationship.

1. **Clarity** - being clear means, among other things, giving explanations that pupils understand, being able to answer their questions intelligently, and giving a clear presentation.

2. **Variability** - using a variety of teaching styles, instructional materials (films, charts, etc.), types of tests, and student activities. Variability also can mean the teacher's flexibility in procedure.

3. **Enthusiasm** - the enthusiastic teacher is one who shows involvement, excitement, and interest regarding his/her subject matter.

4. **Task-oriented and/or businesslike behavior** - being task-oriented and/or businesslike behavior means, among other things, encouraging students to work hard, to do independent work, and being concerned that students learn something rather than enjoy themselves.

5. **Learner opportunity to learn criterion material** - making students aware of what is to be learned and providing an opportunity for the students to learn the material on which they will be tested.

6. **Use of learner and general indirectness** - this means, among other things, acknowledging a student’s idea by repeating or modifying it, accepting students’ feelings, or giving praise and encouragement.

7. **Criticisms (negative relationship)** - the stronger the criticism the less likely students are to achieve. There is no evidence to support a claim that teachers should avoid telling a student that he/she was wrong or should avoid giving academic directions.

8. **Use of structuring comments** - use of structuring comments by teachers include giving signals to indicate the beginning and end of a lesson, providing an overview of what is about to happen, or telling a student that “this is important.”

9. **Types of questions** - research has been done on using divergent/convergent and higher order cognitive/lower order cognitive questions. The results of using one over the other are not conclusive.

10. **Probing** - this generally refers to teacher responses to a student’s answers which encourage the student (or another student) to elaborate upon his/her answer.

11. **Level of difficulty of instruction** - the student’s perception of the level of difficulty of instruction is related to student achievement.
TEST
THE GOOD TEACHER TASK

Name and correctly order the 11 teacher behaviors identified by Rosenshine and Furr as showing the strongest relationship to student achievement. (One point for each named. Three points for correct order.)

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.
SCORING BOX
THE GOOD TEACHER TASK

Directions:
Give each learner:
1 point for each of the 11 behaviors named, and
3 additional points if all 11 are in the correct order.
Maximum score is 14 points.

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<tr>
<th>Learner's Name</th>
<th>Total Score (0-14)</th>
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THE DISCIPLINE IN ELEMENTARY CLASSROOMS TASK*

Read each section carefully

Description of your Reflective Teaching task

You are one of several members of the class chosen to teach this short lesson to a small group of your classmates. Plan to teach it in such a way that you believe both student learning and satisfaction will result.

Your lesson will be taught on ________________.

Introduction to the lesson

Teachers designate things—that is, they denote things directly and specifically to learners. The following are examples of teacher designating behavior:

1. A government teacher tells students the major points of the Monroe Doctrine.
2. An education teacher tells students several teacher behaviors that are related to student learning and satisfaction.
3. A chemistry teacher tells students the principal characteristics of halogens.

Below is an objective that requires you to designate something to a small group of your peers. The task was selected because your success in accomplishing it probably will not be dependent on your knowledge of some academic subject or previous experience you might have had.

Your objective

Your goal is to get as many of your learners as possible to list correctly the eight teacher behaviors that seem to contribute to effective management of elementary classrooms. You will have 15 minutes in which to accomplish your goal.

Materials

1. Discipline in elementary classrooms (attached)
2. Test (attached)
3. Learner satisfaction forms (provided by college instructor)
4. Answer key and scoring box (attached)

Special conditions and limitations

None.

Ending the lesson

Notify the college instructor when your learners are ready to take the test. (You may finish early.) Obtain copies of the test and the learner satisfaction form. Give your learners the test, and when they have finished (no more than three minutes), read them the correct answers so that they can correct their own tests. Use the criteria given with the scoring box for scoring.

Next, pass out the learner satisfaction forms, and while they are being completed, collect the tests and record the scores in the scoring box. Return the tests and collect the learner satisfaction forms.

Begin to work through the questions for small group discussion with your learners.

*The idea for this RTL was contributed by John Holton, Morehead State University, Kentucky.
DISCIPLINE IN ELEMENTARY CLASSROOMS

Professor Jacob Kounin and his colleagues at Wayne State University have worked on the problem of classroom discipline for over 20 years. If we think of discipline in terms of disruption—pupils not paying attention to the work at hand, talking out of turn, whispering, passing notes, for example—we might wonder what teachers who seem to have little disruption in their classrooms do, either to stop disruption or to prevent it from happening at all. Professor Kounin watched videotaped recordings of classrooms to identify those teacher behaviors that seemed related to good classroom management. The videotaped classrooms were all lower elementary grades.

There were eight behaviors that seemed consistently to be related to effective classroom management. They are listed below with a brief summary of what each means.*

1. *Withitness.* The teacher communicates to the pupils that he/she knows what is going on—"has eyes in the back of his/her head." Kounin calls this the quality of "withitness." The withit teacher picks up the first sign of disruption and directs appropriate attention toward the right pupil. In addition, the withit teacher is also good at timing his/her reaction to disruption: neither acting too quickly, nor waiting until a minor matter becomes major.

2. *Overlapping.* The teacher is able to deal with more than one classroom event at once in what Kounin calls an "overlapping" manner. For example, if a student approaches the teacher while the teacher is working with a reading group, the teacher will attend both to the reading group and to the student. As another example, a teacher working with a reading group sees two students in another part of the room fooling around. The teacher keeps her reading group reading while she goes over to the two students.

3. *Smoothness.* The teacher is able to keep the lesson flowing. Kounin calls this "smoothness." It means that the teacher does not interrupt the flow of the lesson by turning attention to irrelevant events, bursting in on students who are at work with orders, statements, and questions. Nor does the teacher leave a lesson hanging in mid-air—changing the topic before reaching closure, or by starting a topic, changing to another, and then returning to the first.

4. *Momentum.* The teacher maintains an appropriate "momentum." The teacher does not slow the lesson down by overemphasizing a student's behavior, a subpoint in the lesson, or the materials of the lesson rather than the substance. The teacher does not deal with the class in fragmented groups, nor does the teacher needlessly repeat instructions.

5. *Group alerting.* The teacher is skilled at involving "nonreciting children in the recitation task," maintains their interest, and keeps them on their toes. This is done, for example, by creating suspense—suspense as to who is going to recite next, asking for a show of hands before choosing a reciter, letting nonreciters know that they might also become a part of the lesson, presenting new, novel, or alluring materials during the recitation.

6. *Accountability.* The teacher holds the class accountable during the lesson by, for example, asking the whole class to show their work by holding it up, getting the whole class to recite in unison, bringing other children into the recitation, asking the students for raised hands if they are ready to recite or to demonstrate their work, and by checking the work of nonreciters by circulating around the classroom.

7. *Valence and challenge arousai.* The teacher tries to get pupils enthusiastic and involved in the lesson by showing zest and enthusiasm him/herself, pointing out that the activity possesses positive aspects, showing that the activity has genuine intellectual challenge.

8. *Variety.* Finally, the teacher makes certain that the activities involved in the lesson are genuinely different from one another.

*More information about this important subject may be found in Jacob Kounin's *Discipline and Group Management in Classrooms*, published by Holt in 1970.*
TEST
THE DISCIPLINE IN ELEMENTARY CLASSROOMS TASK

Name

List below the eight behaviors of teachers that are related to keeping class disruption to a minimum. The responses may be in any order.

1.
2.
3.
4.
5.
6.
7.
8.
ANSWER KEY
THE DISCIPLINE IN ELEMENTARY CLASSROOMS TASK

Key
Answers may be in any order.
1. Withitness
2. Overlapping
3. Smoothness
4. Momentum
5. Group alerting
6. Accountability
7. Valence and challenge arousal
8. Variety

SCORING BOX

Directions
Give each learner:
1 point for each correct answer.
The perfect test would be scored 8.

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<thead>
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<th>Learner’s Name</th>
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APPENDIX B

REFLECTIVE TEACHING
SMALL GROUP DISCUSSION QUESTIONS
Questions for Small Group Discussion

1. What knowledge, skills, or attitudes were you hoping to develop in your learners? To what extent do you believe you were successful in your effort? What do your learners think?

2. In planning for your RTL, what influenced you most? Did the following have any effect on your instructional ideas?
   a. your knowledge of the subject and knowledge about teaching
   b. your attitudes and values about teaching and learning
   c. materials available to you

3. In developing your instructional ideas how did you go about:
   a. building your ideas into a teaching method?
   b. deciding whether or not the method you had in mind would be likely to work?
   c. modifying your ideas into a final teaching method?

4. What is the reaction of learners to the teaching method used?

5. How do you feel about your teaching (learning) experience? What did you like or dislike about it?

6. How did your learners feel about their learning experience? What general advice would your learners give you?

7. What did you learn about teaching?

8. When teaching, you used one or more of many possible teacher behaviors. Here is a partial list of behaviors you may have used. Select one or two you used rather prominently and tell why you chose to use them.

   a. analyzing  
   b. classifying  
   c. comparing/contrasting  
   d. defining  
   e. demonstrating  
   f. designating/labeling/naming  
   g. directing  
   h. discussing  
   n. explaining  
   o. inferring  
   p. interpreting  
   q. justifying  
   r. lecturing  
   s. opining  
   t. quoting  
   u. reacting
i. elaborating  
j. enumerating  
k. evaluating  
l. expanding  
m. generalizing

v. reporting  
w. responding  
x. soliciting/ questioning  
y. synthesizing  
z. structuring/ organizing

9. Which of the above behaviors do your learners believe you were justified in using? What other behaviors do they think you justifiably could have used?

10. How did your learners behave as learners? Were they on time and ready? Did they do everything you wanted them to do at all times? For example, did they pay attention, follow directions, participate, understand? What did you want them to do individually and collectively that they did not do?

11. How do your learners believe you behaved as a teacher? Did you do everything they wanted you to do at all times? What did they want you to do that you did? What did they want you to do that you did not do?

12. What sort of values or beliefs about learning do you hope future students of yours will have? What do you believe you can do as a teacher to encourage such values in students? Do you think the students in your RT group share your values?

13. What do you believe about teaching?

14. What do the learners believe about teaching?

Questions for Large Group Discussion

1. How did you go about teaching the RTL? Describe briefly how and why you taught your lesson as you did.

2. How successful was your methodology in bringing about learning and satisfaction?

3. What was your teacher like or what did your teacher do that you believe contributed to learning and satisfaction? What could your teacher have done that probably would have caused increased learning and satisfaction?
4. What did you learn or rediscover about teaching and learning?

5. What did you learn about your strengths and weaknesses as teachers?

6. Do you believe you changed any of your ideas about teaching or attitudes toward teaching? If so, which ones?

7. What do you believe makes a teacher effective?

Variation is possible. For example, all questions can be discussed in the small groups or conversely, all can be discussed by the whole class. Other questions may be substituted as deemed important by the instructor.

The questions for small/large group discussion were developed generally to facilitate the following outcomes:

1. Designated teachers will describe how their teaching methodology evolved, i.e., how they decided to teach their RTL and why.

2. Designated teachers will evaluate their teaching methodology in terms of learner achievement and satisfaction.

3. Participants will express and consider affect or feeling about teaching and learning. Such expressions will take the form of attitudes, values, emotional sets (likes and dislikes), and interest.

4. Learners will describe what designated teachers did that contributed to learning and satisfaction. They also will describe what designated teachers did that contributed to learning and satisfaction. They also will describe what designated teachers could have done that might have caused increased learning and satisfaction.

5. Participants will describe what they learned about teaching and learning both generally and specifically.

Appendix A (also provided in the Participant's Guide) may be helpful in considering the factors that might have influenced the teaching and learning. Use of Appendix A might prompt these questions:

1. The teacher - What characteristics, professional and personal, did your teacher have that contributed to learner achievement and satisfaction?

2. The learners - What characteristics did the learners have that contributed to success?

3. The learning environment - What properties did the context or setting have that contributed to success?
4. The curriculum - What properties did the content to be learned have that contributed to success?

5. The teachers' behaviors - What behaviors did the teacher demonstrate that contributed to learner achievement and satisfaction? For example, to what extent did they demonstrate clarity, enthusiasm, variability? To what extent did they keep learners on the task? To what extent did they apply principles from psychology of learning, e.g., drive, cue, response, reinforcement? To what extent was direct versus indirect instruction used and suitable?

6. The learners' behaviors - What behaviors did the learners demonstrate that contributed to achievement and satisfaction? For example, to what extent were learners interested and attentive?

Appendix B (not in the Participant's Guide) contains a summary of recent research on teaching. It also may be useful during discussions.

Another way to view the teaching is to relate it to what otherwise has been studied in the course. If Reflective Teaching is used with a course and if the course has covered planning, executing, and evaluating instruction, then the following could be discussed:

1. Lesson planning - What do we know about it? How did we incorporate what we know about it?

2. Execution of instruction - What do we know about instruction? How did we incorporate what we know about it?

3. Evaluation - What do we know about it? How did we incorporate what we know about it?

Finally, a fourth order of inquiry might be to provide practice in analyzing the teaching acts that occurred, by utilizing existing observational systems (FIAC or OSIA) so that designated teachers can receive specific information on their teaching behavior including use of questions, amount of student talk, and so forth.

It seems clear that since teaching occurred, it is available for objective inspection, consideration, analysis, and evaluation. The outcomes that can be attained during the reflective session are the same as those that can be sought after observing teaching in a natural classroom. These outcomes should be related to the maturity and experience of the participants (teachers and learners) involved. The reflective session can be very rich and can proceed in a number of different directions. Remember the ultimate goal of the instructor is to make the reflective session as stimulating and provocative as possible to encourage participants to become students of teaching.
APPENDIX C

REFLECTIVE TEACHING
LEARNER SATISFACTION FORM
LEARNER SATISFACTION FORM
(Cruickshank et al., 1980)

Name ________________________________________

1. During the lesson how satisfied were you as a learner?
   __________________ very satisfied
   __________________ satisfied
   __________________ unsatisfied
   __________________ very satisfied

2. What could your teacher have done to increase your satisfaction?
APPENDIX D

REVISED LEARNER SATISFACTION FORM
Learner Satisfaction Form
Reflective Teaching Lesson (RTL)

Name of RTL Designated Teacher
(print)

1. Please consider how well you, as a learner, were satisfied with today's Reflective Teaching Lesson. In arriving at a ranking, take these items into account:

   - classroom arrangement and use of teaching materials
   - presence of creative or unusual teaching ways
   - eliciting and handling of questions from the group
   - use of teaching time according to schedule and sequence

Circle a number on the line below that represents your overall level of learner satisfaction.

10 9.5 9 8 7.5 7 6 5.5 5 4 3.5 3 2 1.5 1

Exceptionally Very Well O.K. Not Quite Dissatisfied

2. What could your RTL Teacher have done to increase your satisfaction?
APPENDIX E

THEORETICAL COMPONENT TO SUPPLEMENT REFLECTIVE TEACHING

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REFLECTIVE THINKING:
FROM THEORY TO CLASSROOM PRACTICE

OBJECTIVES

1. Students will be able to define and discuss reflective thinking.

2. Students will be able to diagram a model of the role of reflection in the learning process.

3. Students will be able to list three cognitive processes involved in reflection.

4. Students will be able to discuss three outcomes or benefits of reflective thinking.

5. Students will be able to provide a rationale for the need for teachers to be reflective about their work.

6. Students will be able to list and explain Van Manen's (1977) three levels of reflectivity.

7. Students will be able to apply Van Manen's levels of reflectivity in analyzing given classroom situations.

QUESTIONS ON CHALKBOARD BEFORE BEGINNING SESSION

1. What is reflective thinking?

2. What cognitive processes are involved in reflection?

3. What are the outcomes or benefits of reflective thinking?

4. Why do teachers need to be reflective about their work?

5. What are the levels of reflectivity associated with classroom teaching?

6. How does this fit in with Reflective Teaching?
LECTURE OUTLINE

I. What is reflective thinking?

A. General discussion/definitions

1. Reflection occurs when something is brought to mind so that consideration can be given to it
2. Exploring experiences mentally in order to lead to new understandings
3. Internally examining and exploring an issue of concern, creating and clarifying meaning for oneself
4. Asking basic questions of oneself: What am I doing and why?

B. The role of reflection in the learning process

1. Reflection is a key element in the learning cycle (Kolb, 1975; Boyd & Fales, 1983)
2. A model of the role of reflection in the learning process: (Kolb, 1975)
   (*Use overhead transparency*)

   Concrete Experience
   Applying these in new situations
   Observations and Reflections
   Forming generalizations and new understandings

3. In order to learn from our experiences we need to reflect on them, to analyze them, to form new insights that we can then apply to future situations
4. Often individuals are not aware that they are reflecting, but by becoming more aware of their own reflective thinking processes, individuals can use them as a tool for learning and growth (Boyd & Fales, 1983)
C. Cognitive processes involved in reflection
(*use overhead transparency*)

1. Exploring and examining an experience to clarify the meaning of the experience (to understand it better)
2. Questioning why things happened as they did...What caused things to turn out this way?
3. Questioning why individuals do what they do; looking for underlying rationales or justifications for behavior
4. Thinking of new or different courses of action. What would happen if things were done differently next time? What justification is there for a different course of action?
5. Determining the unintended effects of the experience on the people involved

D. Outcomes of reflective thinking

1. John Dewey (1933): "Reflection emancipates us from merely impulsive and merely routine activity...[and] enables us to direct our actions with foresight and to plan according to ends-in-view, or purposes of which we are aware."
2. Reflective thinking leads to new understandings and appreciations (Boud, Keogh, & Walker, 1985)
3. Reflection crystallizes and reinforces previous learning
4. Reflection develops concepts and generalizations for future use
5. Reflective thinking helps identify the need for additional learning before further experience is acquired
6. The outcomes of reflection include new ways of doing things, clarification of issues, development of new skills, and the resolution of problems (Boud, Keogh, & Walker, 1985)

II. Why do teachers need to be reflective about their work?

A. Initial teacher preparation is insufficient; teachers must continue to learn and grow "on the job"

1. College courses cannot teach you everything you need to know about teaching
2. Each teaching situation is different; what works in one setting may not work in a different setting with different students
3. All teachers encounter situations where they are unsure about the best course of action

B. Reflecting on classroom situations can help teachers understand why things happened as they did

1. By reflecting on positive classroom situations, teachers can identify effective strategies that should be used again in future situations
2. By reflecting on problematic classroom incidents, teachers can identify alternative courses of action that may work better in future situations
3. Reflective Teaching: learning from classroom situations by reflecting on them and applying new insights to future teaching situations (*Use overhead transparency*)

\[ \text{Teaching or Classroom Situation} \]
\[ \overset{\rightarrow}{\text{Applying this new insight to new teaching situations}} \]
\[ \overset{\rightarrow}{\text{Reflected on what happened and why}} \]
\[ \overset{\rightarrow}{\text{Forming new understandings of the situation}} \]

(Cruickshank, 1985)

C. John Dewey's philosophy on preparing reflective teachers

1. Teachers should be "students of teaching," learning from and improving on their own teaching practices
2. It is more important for teachers to be "students of teaching" than it is for them to have immediate technical proficiency
3. Teachers who do not reflect on and learn from their own teaching operate on the basis of routine and habit
III. Van Manen's (1977) levels of reflectivity associated with classroom teaching

A. Level One: Teaching techniques and their effects

1. Definition: At this level teachers consider how effective their teaching techniques are. The focus of reflection is on teaching methods, not on larger educational goals and aims.

2. Questions asked at this level:
   - What works best to teach this lesson?
   - Is this particular method an effective way to teach this lesson?
   - Are students learning what they are supposed to learn?
   - How effective is the lesson?

B. Level Two: Justifying educational goals and practices

1. Definition: At this level, teachers focus on why specific educational practices and goals are used. Here the goal is not so much looking at how effective specific methods are, but on justifying them in terms of student characteristics and the type of subject matter. Reflecting at this level involves giving a rational for the school's educational aims, goals, and practices.

2. Questions asked at this level:
   - What is the rationale for using this method, considering the characteristics of the students and the subject matter?
   - What is the rationale for the lesson's objectives or goals?
   - Why should students participate in this lesson?

C. Level Three: Relating school practices to larger social issues

1. Definition: At this level, the focus of reflection is on the relationship between school practices and societal expectations. Teachers consider their own underlying assumptions and expectations, as well as those of society at large.

2. Questions at this level:
- What does this lesson indirectly teach students about society and societal expectations?
- What "hidden curriculum" might students unconsciously be receiving?
- What underlying assumptions and expectations do the teacher and the lesson reveal?
- What biases are evident in the subject matter or in the teacher's practices? (e.g., sexism, racial bias, stereotypes, etc.)

IV. Summary

A. In this lecture, we:

1. Defined reflection
2. Described the cognitive processes involved in reflection
3. Looked at models of how reflection fits into the learning cycle
4. Discussed why teachers need to be reflective about their work
5. Explained Van Manen's three levels of reflectivity in relation to classroom teaching

Discussion Questions:

1. What are some examples of reflective thinking from your own experiences?
2. Are there instances you can think of when you used reflection consciously to help in learning new material, in solving problems, or in analyzing personal experiences?
3. Can you think of instances where you used reflection without being consciously aware of it?
4. What are some classroom situations that teachers should reflect on?
5. Think of a classroom in which you observed (e.g., Freshman Early Experience Program). Reflect on one or two classroom incidents. Was the teacher's method effective in that situation? Why or why not? What caused students to react in the way they did? What was the teacher's rationale for her lesson objectives, goals, and activities? What underlying assumptions or biases did the teacher hold?
DEMONSTRATION

Now I'm going to give an example of a classroom situation from my own background and show you how Van Manen's three levels of reflectivity can be applied to analyzing and reflecting on the situation.

When I was in seventh grade, our science teacher asked us one day whether we knew that hot water froze faster than cold water. We were all surprised, and he asked us to think of reasons why this is the case. After a bit of brainstorming, I volunteered that it may be due to the fact that hot water evaporates faster than cold water, so by the time the water froze, there was actually less of the hot water and therefore it froze faster. My answer was incorrect, but the teacher made a big point of the fact that my answer was logical, reasonable, and could be tested to see if in fact that was the correct hypothesis. He minimized the incorrectness, and emphasized the importance of thinking logically and generating testable hypotheses, which I had done. To this day I remember that hot water freezes faster than cold water because of the stronger convection currents in hot water. Even more importantly, I learned that being able to reason logically and defend your answer was just as important as always getting the right answer.

Now let's apply Van Manen's three levels of reflective thinking to analyzing this situation.

**Level one:** What methods did the teacher use? Did the teacher's methods work? Were they effective? Did the students learn what they were supposed to learn?

In reflecting at this level, our conclusions must be based on the experiences of one student since we do not have enough information about the rest of the class. For this student, at least, the method was effective. The teacher's methods included asking students a thought-provoking question, presenting an unexpected phenomenon, and then asking students to generate hypotheses and support them. These methods worked well for me -- I learned what I was supposed to learn, and have retained that knowledge over a long period of time.

**Level two:** Why did the teacher use that method? What rationale is there for using this method with these students? Why should students learn this material?

In reflecting at this level, we consider the characteristics of the students and the subject matter.
Seventh graders are in the Piagetian stage of formal operations and can handle talking abstractly, hypothesizing, and reasoning. Therefore this method was appropriate to the developmental level of the students. The subject matter was from the sciences, and the method used (hypothesizing, etc.) was appropriate to and consistent with the discipline from which the subject matter was drawn. Why should students participate in this type of lesson? To better understand the natural world around them, to become familiar with the scientific method, to develop their ability to hypothesize and reason logically.

Level three: What underlying beliefs, assumptions, or expectations does the teacher hold?

Again we are limited by the information available, but we can conclude at the least that the teacher was more concerned with the process of arriving at an answer than with always arriving at the "one correct answer." His methods seem to indicate that he felt it was important for students to participate in and take responsibility for their own learning. He also seemed to place importance on being able to think things through logically and to back up answers with reasonable arguments. The students were likely picking up on these expectations as well as the actual subject matter being discussed that day.

SMALL GROUP ACTIVITY

Ask students to think back over their years of education: elementary, secondary, and college. Have students pick out one or two situations that made them as students feel either really terrible or really great. Students should jot down one or two sentences about the experience(s) to help them remember when they get into small groups.

After students have identified one or two classroom incidents to reflect upon, have students get into small groups of two or three. In their small groups, students should briefly share the selected experiences and then reflect on them using the three levels of reflection discussed by Van Manen. To help guide students' reflections and discussion, distribute handouts summarizing the three levels of reflection and listing the types of questions to be asked at each level.

After about ten or fifteen minutes, reconvene the students into a large group and ask them to share and discuss any insights or generalizations about teaching they formulated in the reflective thinking sessions.
CONCLUDING THE SESSION

Briefly summarize today's key points and relate them to the Reflective Teaching regimen in which students will participate during the next three class sessions.
COGNITIVE PROCESSES INVOLVED IN REFLECTION

- Exploring and examining an experience to clarify the meaning of the experience (to understand it better).

- Questioning why things happened as they did ... What caused things to turn out this way?

- Questioning why individuals (teachers and students) do what they do ... justifying their actions.

- Thinking of new or different courses of action. / What would happen if things were done differently next time?

- Considering the unintended effects of an experience on the people involved.
A MODEL OF REFLECTION IN THE LEARNING PROCESS

CONCRETE EXPERIENCE

APPLYING THESE IN NEW SITUATIONS

REFLECTING ON THE EXPERIENCE

FORMING GENERALIZATIONS AND NEW UNDERSTANDINGS

(Kolb & Fry, 1975)
A MODEL OF REFLECTIVE TEACHING

TEACHING OR CLASSROOM EXPERIENCE

APPLYING THIS NEW INSIGHT TO NEW SITUATIONS

FORMING NEW UNDERSTANDINGS AND GENERALIZATIONS

REFLECTING ON WHAT HAPPENED AND WHY

(Cruickshank, 1985)
STUDENT HANDOUT

Van Manen's Levels of Reflectivity

Level one: Teaching Techniques and Their Effects
At this level, teachers consider how effective their teaching techniques are. The focus of reflection is on teaching methods, not on larger educational goals and aims. At this level, teachers reflect on how well students learn when specific methods are used. Questions like the following are asked:

- What works best to teach this lesson?
- Is this particular method a good way to teach this lesson?
- Are students learning what they are supposed to learn?
- How effective is the lesson?

Level two: Justifying Educational Practices and Goals
At this level, teachers focus on why specific educational practices and goals are used. Here the goal is not so much looking at how effective specific methods are, but on justifying them in terms of student characteristics and the type of subject matter. Reflecting at this level involves giving a rationale for the school’s educational aims, goals, and practices. Questions like the following are considered:

- What is the rationale for using this method, considering the characteristics of the students and the subject matter?
- If you would choose another method, can you justify that choice?
- What is the rationale for the lesson’s objectives or goals. Why should students participate in this lesson?

Level three: Relating School Practices to Larger Social Issues
At this level, the focus of reflection is on the relationship between school practices and societal expectations. Teachers consider their own underlying assumptions and expectations, as well as those of society at large. They consider how the school’s practices mold and shape students to fit society’s norms. Questions like the following are asked:

- What does this lesson indirectly teach students about society and societal expectations?
- What “hidden curriculum” might students unconsciously be receiving?
- What underlying assumptions and expectations do the teacher and the lesson reveal?
- What biases are evident in the subject matter or in the teacher’s practices? (e.g., sexism, racial bias, stereotypes, etc.)
APPENDIX F

DESIGNATED TEACHER ASSIGNMENT SHEET
Reflective Teaching
Student Assignment Sheet

Monday, April 11:
The Magic Square Task (4 designated teachers)
1. ________________________________________
2. ________________________________________
3. ________________________________________
4. ________________________________________
The Discipline in Elementary Classrooms Task
(3 designated teachers)
1. ________________________________________
2. ________________________________________
3. ________________________________________

Tuesday, April 12:
The Origami Task (4 designated teachers)
1. ________________________________________
2. ________________________________________
3. ________________________________________
4. ________________________________________
The John Dewey Task (3 designated teachers)
1. ________________________________________
2. ________________________________________
3. ________________________________________

Wednesday, April 13:
The Vocabulary Task (4 designated teachers)
1. ________________________________________
2. ________________________________________
3. ________________________________________
4. ________________________________________
The Good Teacher Task (4 designated teachers)
1. ________________________________________
2. ________________________________________
3. ________________________________________
4. ________________________________________
APPENDIX G

DIRECTIONS FOR INSTRUCTORS
1. What is reflective thinking?

2. List three cognitive processes involved in reflective thinking.

3. Below is a model of learning as a four-stage cycle. Complete the model by filling in the blanks with phrases describing each stage.
4. Briefly describe the three levels of reflective thinking discussed by Van Manen (1977).

Level one:

Level two:

Level three:

5. Why should teachers be reflective about their work?
APPENDIX I

PRETEST DIRECTIONS AND
TYPESCRIPT OF CLASSROOM DIALOGUE
You will see a 15-minute videotape of a classroom teaching episode. In this episode, you will view a sixth-grade social studies lesson on "Our American Roots." To help you follow and think about the discussion, you have been given a typescript of the classroom dialogue. After viewing the videotape, you will be asked to write an essay analyzing the classroom teaching/learning episode you observed. You will have twenty minutes to think about and write an analysis of this teaching episode.

Name _____________________
T: The title of our lesson that we're going to do today is called our American roots. Can anyone give me an idea of what that means to you? Steve?

S: Well, it's where our ancestors came from.

T: Good. Let's see if any of us in here are native Americans. Raise your hand if you're a native American, if your roots are native American. Two, three. Very good. So the rest of you, your relatives and families that came before you, moved over here. Is that correct? OK. Raise your hand if you think it would be an exciting thing to move to a new country.

(students raise hands)

T: Wow! I'm surprised! You're very courageous! OK Take out the sheet you collected the data on, about the background of your family. Alright? And today, what we're going to do is we're gonna ... by collecting and organizing this family background we're going to see how our families immigrated to the United States. Alright. So the first thing I want to do is to find out who is an immigrant, who is first generation, second generation, and so on. Let's review those terms really quickly. Who can tell me what an immigrant is? Lindsey, please.

S: It's the person who comes over from another country.

T: Good. OK who can tell me what a first generation person is?

S: Well, it's when your parents if they came from another country.

T: OK. So then you're the first generation or your parents are?

S: I am.

T: Good. OK who can tell me what second generation means? Cyril?

S: You're second generation if your grandparents immigrated.

T: Great. Does that pattern continue on and on?

S: Yes.
T: Great. Well let's get some data here on the board first and please raise your hand if you're an immigrant. OK, one person. Very good, Ragah. OK, and if you're a first generation raise your hand. One, two, three, four, five, six. You guys help me if I count wrong. Second generation? By the way, are you getting your information from your research?

S: Uh huh.

T: OK. One, two, three, four. Good. Third generation? One, two, three, four, five, six, seven, eight, nine. You sure about that, Heather? Good. Nine? Alright, if you're a fourth or more generation American please raise your hand. One, two, three, four, five, six, seven, eight, nine, ten, eleven, twelve, thirteen. Thank you. OK let's take a look at that. Um, can anybody give me an idea... I'll take a quiet hand with a suggestion... on how we can show this in a more concrete or visual way. How can we show this information? I'm waiting for everyone to get their ideas together. OK how about you guys over there? Gene, give me a suggestion.

S: We could make a graph.

T: Alright, uh, let's see. What kind of graph?

S: Uh, we could use a pie ... a pie chart, you know. It shows the different types. That would work.

T: Good idea. Pie graph. What else, Beth?

S: Bar graph.

T: A bar graph. Why do you say bar graph?

S: It shows you how many more people were in one area. When you look at a bar graph you get a good idea of what you're looking at. The higher area and all that.

T: Great. I was hoping someone would say that. What I have here... Laura, would you like to help me by putting it up in those clips up there? You'll need a chair to put it up high. There's a chair.

(student hangs up chart)

T: There you go, slide those in. Pull it out. Good. OK, you want to get some tape to fix that? Here's some tape. Thanks.
OK while she's working with that, um, let's see what does it say here? You guys tell me.

S: Number of students.

T: Good. So... and what do we have over here?

S: One.

T: Good and...

S: Six.

T: Good. So I've written generations down here. Can I have two people who can make this bar graph for us? OK Serge, would you come on up and Heather come on up. What I you guys to do Serge, I want you to take these pencils and graph, you know, label these categories we have information for. The number of students needs to go here and then you draw the bars up to indicate how many. Ok. Now while they're making the graph for us, I'm going to pass out a piece of paper that has your picture on it. Now what I want you to do is look on your research chart here and write the country that the person that you've studied and researched came from. The country they originated from. Now you can do two if you'd like to. And what I want you to do next is... let's say if this is mine -- is I want you to come up here and I've listed all the continents for you on this chart. I want you to put your picture and the country's name up under the continent that your ancestor came from. OK? So let's see here let's go over the seven continents really quickly. What's this one?

S: Africa.

T: Good.

S: Antarctica.

T: Good.

S: Asia.


T: Great. Antarctica might not have a big chance of people coming from it. But I do want you to do that. Then after you mark the chart I want you to come over here and I have pins for you to mark on this world map the country which your ancestor originated from. You can
just remove the pin and place it over in the country.
Yes, Peter?

S: For the chart, is there like some tape to, uh, apply our names to it?

T: We have this plasti-tak. You can just tear a piece off and stick it up. Good question. Jennifer?

S: Well, uh, if our ancestors came from two countries can we put two pins in for each different country?

T: I want you to choose one.

S: OK.

T: I have pins up there for each person to choose one and to put it up there. Cyril.

S: So we put two names on the card and we put it up there with plasti-tak and we then put the pins in the country where they came from.

T: That's right. You may do two up here. Two countries. OK. Now I know a lot of you are anxious to come up and do this chart so while that's being worked on I'm going to pass out some binder paper here. So that as this graph is put up and as people come up and do this chart here and for those of you right up here in the front I know it might be hard to come up here and see it when you're way back there but when you do come up to put your pin on you can kinda study the world and see what it looks like is happening as people come up and pin their pins in. What I'd like everyone to do is to give me five statements about what this graph and the chart and the map show you. OK... can be, um, anything, any facts that you notice or any more or less... or anything you can infer or conclude by reading those maps and charts and graphs. Any questions? OK Beth tell us what you're going to do.

S: I'm going to go up when I'm called up or however we're going to follow each other up. I'm gonna write my name on the little green card with my picture on it. Write the name of my... of the people who immigrated here and put the country that they're from and then go over to the map and study the world and put a pin on one of the countries that they immigrated from.

T: Good. OK, just on this paper all you need to write is... OK you can write your family's name if you want
since it has your picture on it. But it's OK if you
don't write any name. Just the country is what I'm most
interested in. OK Lenny pass these out now and I'm
going to start the binder paper at the same time.
Chris, can you handle that for me?

S: Sure.

(materials are distributed)

T: Class, can I have your attention one more time? I'd
like you to if you need too ... There's atlases up here
... if you need to look up what continent or where your
country is. OK I'll be walking around to see if anyone
needs help on this.

(students begin working on assignments)

T: I really like the way people are looking at the graph
and chart and deciding what to write...
APPENDIX J

POSTTEST DIRECTIONS AND TYPESCRIPT OF CLASSROOM DIALOGUE
You will see a 15-minute videotape of a classroom teaching episode. In this episode, a high school literature class discusses Edgar Allan Poe's *The Telltale Heart*. To help you follow and think about the discussion, you have been given a typescript of the classroom dialogue. After viewing the videotape, you will be asked to write an essay analyzing the classroom teaching/learning episode you observed. You will have twenty minutes to think about and write an analysis of this teaching episode.

Name __________________________
T: You've all read this as a story. Now I want you to use your creativity and imagine yourselves as a playwright. OK, we're going to turn this into a stage play if you can. Alright, for that I'm going to need some props. You all know what props are? How many of you have seen a stage play before live? Either on TV or live? So you have some idea of what it looks like on the stage? OK, we're going to need some props. Props are things that go on the stage to make it look realistic. Now think back to the story. Imagine yourselves now -- remember you're a playwright. Your job ... to do this. What kinds of props do you think you might need for this production?

S: A grandfather clock.

T: A grandfather clock -- what's a horror story without a grandfather clock? OK, anything else?

S: A piano.

T: A piano, good. OK.

S: An old wooden chair.

T: An old wooden chair -- a squeaky old wooden chair. OK anything else.

S: A lantern.

T: A lantern, good. OK anything else?

S: A dark room.

T: A dark room. OK.

S: A bed.

T: A bed. Gotta die someplace, right?

S: A squeaking door.

T: A squeaking door. Could there be a horror story without a squeaking door?

S: No.

T: OK. Now let's turn our attention to the surroundings of the stage. We need a door. Don't we? I mean, the man
has to come in. OK we need a door. What else? Windows. What about the windows?

S: Covered with spider webs, could it be?

T: No, now remember, this is a man who is kinda wealthy, you know. This is a stately mansion. I'm sure he has a housekeeper, so ... not quite that eerie.

S: Have bars over the window or something?

S: Open windows.

S: Shutters.

T: If you have a window this is something that's on the inside. Now remember we're trying to create what kind of mood here? What kind of mood?

S: Dark, dreary.

T: Dark, dreary. SO what's going to be at the window?

S: Drapes.


S: Dark.

T: Usually, what material?

S: Cloth.

T: Cloth but what kind? Think heavy, thick.

S: Wool.

T: Smooth.

S: Polyester.

(laughter)

T: That's today... that's today!

S: Wool.

T: No no no think ... Now stop for a minute. Think heavy. Think smooth.

S: Cotton.
T: Dark, dreary.
S: Dreary.
T: Christmastime... little girls are in what kind of dresses?
S: Velvet!
T: Right, velvet drapes. That would certainly do it. What about the floor.
S: Squeaky floor.
T: Squeaky floor. OK where does the clock fit?
S: In the corner.
S: In the living room above the fireplace.
T: The fireplace. So we need a fireplace. OK. Now most of the action, however, takes place where?
S: In the bedroom.
T: In the bedroom and that's called ... In the story what's that called?
S: The main setting.
T: No, within the story, as you were reading it, they didn't call it a bedroom.
S: A chamber.
T: A chamber. OK so we're going to need a chamber setting and all of these things will be in it. OK. Now we have the setting down. We're going to move to somebody to act on the stage. OK? How many characters do we need?
S: Two.
T: How many?
S: Five.
S: Two.
S: Five.
T: Five, four, two? OK, we have the old man...
S: Uh huh.

S: The murderer.

T: The narrator ... the murderer, right, and three police officers. That's five. OK. Do we have any volunteers? Somebody take this down. The reason we're doing this is later on we're going to have to decide what we're going to do for the senior class drama presentation. So we're doing this so that we can have some idea of what we're going to do this or something else. So if we take this down it's something we won't have to do later on. OK let's start over here. Give me characters. Any volunteers? OK let's go for the old man. Albert -- the old man. Why do you think you'd be a good old man?

S: I act like one.

T: You act like one? What are some of your characteristics that led you to believe you'd be a good old man?

S: He's senile.

T: He's senile? Well was this man senile? Was he senile?

S: No.

T: He wasn't senile. He was just bedridden and old and kinda shaky. You can imagine someone this old would be kinda shaky. I think Albert would be an excellent old man.

(laughter)

T: Alright, what about the narrator or the murderer? Oh, now, come on!

(student raises hand)

T: But you're a female!

S: Females murder!

T: True, but we've got to stick close to the plot. We want this to be realistic. In fact there are no females in this story.

S: Sure enough.

T: OK. So fellows, it's up to you. The murderer -- the narrator. OK, since we can't get volunteers we'll call
upon the ladies. Who would you nominate as the murderer and why?

S: Aaron.

T: Who said Aaron? Diane?

S: And why?

T: And why?

(laughter)

S: Not as the murderer, just as the narrator.

T: But he’s got to be the murderer. The narrator is the murderer.

S: I’ll say Aaron, too.

T: You say Aaron, too?

S: Yes

(laughter)

S: He seems like someone who could plan out something like that. He could.

T: Aaron, remember I think that’s a compliment.

S: OK, a compliment.

(laughter)

T: Hey, not many people can be murderers for play, let alone for real. But I mean, you know...

S: It’d be a hard job.

T: Think you can handle it? Alright, Aaron has volunteered, finally, to be the narrator. OK. OK, so we can set this aside, and set it on hold, and see if we can’t maintain this atmosphere that we have created on stage and jump into the discussion, the questions, and see what we can come up with. I want you to keep that feeling of suspense. It’s going to motivate you, isn’t it, into a lively discussion. OK. I gave you some questions for reflection when you had the selection given to you. One of the ideas was how is the murderer caught? Kelly?
S: The police came, two policemen, two detectives. They stayed for a long time. I guess to see if something would turn up, to see what's going on... and the narrator started hearing heartbeats louder and louder underneath the floor where he had it hidden so he just turned himself in and showed them where the body was.

T: Was he as calm as that? I'll just turn myself in?

S: No, no. He was terrified cause the heartbeat gradually got louder and louder and he couldn't understand why the police chief and detectives didn't hear it. He thought they heard it and they were just planning a mockery on his terror.

T: That's it. Excellent. Alright, so now we have the murderer caught because of his own bizarre behavior. No other reason. Now as you're answering these questions keep in mind what I told you about Poe. Poe's philosophy was that a story should strictly entertain. It doesn't have to have any kind of theme, no parable, no moral, it didn't have to teach you a lesson... he was strictly out to entertain. What do you think about this? Did it just purely entertain? Was there a theme? Did anyone see a theme? Could anyone pick out a theme? What do I mean by theme?

S: Title.

S: Topic.

T: A topic, a story line, something that's running throughout.

S: A moral.

T: A moral. Could anyone pick out anything like that in here?

S: The old man thought that the guy was out of courtesy being nice to him, when actually he was being nice to him for him not to think he was going to kill him.

T: Did he really have that in mind? Now remember...

S: No.

T: What do you think?

S: He didn't plan on killing him -- he just couldn't stand his eye!
(laughter)

T: That evil eye. Did you ever hear your grandmother or somebody older say that evil eye on you? You know, put that evil eye on you? Have you ever heard that expression before? The evil eye.

S: Yes.

T: Well, the narrator took it literally. I mean, the man went off! OK, now, would you agree or disagree that in effect he gives himself away?

S: Agree.

T: Why?

S: Cause he's suspicious.

T: Cause he's suspicious. He was afraid someone was going to catch him. Maybe he was so nervous that it went to his head.

T: Right, it went to his head alright -- blew the top of it off, you might say! OK Albert, what do you think?

S: I was thinking he was too nervous. He was squirming in his chair and all of a sudden he just got out of his chair and started pacing the floor in long strides.

T: Right.

S: And the police were sensing that something was wrong because he kept pacing the floor and getting more nervous.

T: Right. What part did the police play in this?

S: To bring out ... to bring out ... they like... it was more or less to bring out the scaredness of the person... they would be like... I can't put it into words... the guiltiness... by just sitting...

T: Right. Just sitting there.

S: Right. To see what reactions they would have from the questions and then maybe they could pull the motive from that.

T: Right. Now the police... what kind of game are they playing?
S: A mind game.

T: A mind game. They're playing a mind game. They're playing a mind and a waiting game. Waiting for this man to go off the deep end. They can see how nervous he is. I mean, his chair is just going nuts, you know, right in front of their face. So they figure well, we'll just sit and lay in wait and see what happens. You know, this man's bound to go off, which in fact, we shall see if he does. OK, why in your opinion does the narrator take the police to the old man's chamber?

S: I think cause he thought he had nothing to fear.

T: Right, right. Nothing to lose. He's so confident, you know, this is the perfect crime. As far as he is concerned this is the perfect crime, so why not... What? What's the word I'm looking for? If this is the perfect crime, why not...

S: Test them?

T: Test them! Great! Why not test them... see how cool they really are. They're supposed to be what's happening. The police are supposed to be what's happening. He's gonna see. What does his overconfidence get him?

S: Caught!

(laughter)
APPENDIX K

REFLECTIVE TEACHING INDEX
RATING FORM
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APPENDIX L

OPERATIONAL DEFINITIONS FOR
REFLECTIVE TEACHING INDEX
DISCOURSE CATEGORIES
Reflective Teaching Index
Operational Definitions and Examples

**Factual Discourse** is analysis oriented toward describing what is, what was, or what will be. There are four types of factual discourse:

1. **Descriptive discourse** represents an account of factors related to the specific observation, and is verifiable in terms of observational tests.
   
   **Examples:**
   "The instructor stopped to check and see if the students knew exactly what they were supposed to be doing."
   "The teacher started off by giving the students instructions about what they were discussing."

2. **Informational discourse** is concerned with the identification of information pertinent to the observation but not verifiable by observational tests applied to the specific lesson under analysis.

   **Examples:**
   "Great women have played men's roles on Broadway."
   "This method is also used for social studies classes."

3. **Hermeneutic discourse** focuses on the meanings created by the observer or any of the participants in the setting of the classroom.

   **Examples:**
   "Setting a mood is something we all rather take for granted and often it's hard to pinpoint what sets a mood."

4. **Explanatory/hypothetical discourse** is characterized by attempts to identify causal relationships operating in the educational setting.

   **Examples:**
   "The teacher seemed to verbally relate to the students by talking on their level, which helped keep the discussion going."
   "Positive reinforcement made the students more willing to talk in class without fear of negative consequences."
   "The teacher acted very excited about the lesson, which in turn got the students excited about it."
Prudential discourse is concerned with suggestions and advice regarding pedagogical actions and with evaluations of the worth and quality of such actions. There are four types of prudential discourse:

1. **Instruction:** when the observer states that the teacher should try a particular procedure, without giving a justification or rationale for the suggested method.

   **Examples:**
   "The teacher should have explained everything that was to be done in the class first and then let the class do it."
   "If they were actually going to produce the play, another play should have been chosen."

2. **Advice/opinion:** when the observer identifies and suggests two or more alternative methods that the teacher should think about using without providing a rationale or justification for the suggestion.

   **Examples:**
   "Why not put the girls down for male roles or choose another play?"
   "The teacher could have made the students work individually or in small groups."

3. **Evaluation:** when the observer renders a positive or negative judgment about the value, worth, or quality of an action, without justifying or supporting that evaluation.

   **Examples:**
   "I did not feel that her presentation was very smooth."
   "I feel the teacher did a good job in producing a group discussion."
   "The teacher seemed well-organized and prepared."

4. **Support:** when an empathetic response or emotive encouragement is given in relation to past, present, or future action.

   **Example:**
   "I am sure with more experience in front of the class, the other things I mentioned will be corrected."
Justificatory discourse entails the identification of various types of reasons and rationales underlying past, present, or future pedagogical actions. This type of discourse is primarily concerned with consideration of questions of why do this, in this way, with these particular students. Justificatory discourse is divided into three subcategories based on the types of rationales offered as the reason for the actions.

1. **Pragmatic rationale** employs criteria which point to what is effective or efficient in a situation; what "works" in a given situation.

   **Examples:**
   "This teaching method helped the students remember the material more effectively than the lecture method would."
   "Another effective method the teacher used was breaking the lesson down, starting with a simple base structure that the students were able to understand and then building on that."

2. **Intrinsic rationale** justifies an action on the basis of claims about universal knowledge, universal values (e.g., fairness, honesty), and student needs (e.g., level of maturation); an action that is intrinsically justified is an action valued in and of itself.

   **Examples:**
   "This teacher, because of the age group of the students, included a hands-on experience for her students."
   "In this episode, the teacher guided the students through the topic, because the students hadn't been introduced to the topic at hand yet."

3. **Extrinsic rationale** is applied to criteria external to the situation and present actions, including such things as potential utility to society and the vocational needs of the students.

   **Examples:**
   "This type of learning will help the students in the future more than memorization. If they develop these cognitive processes early, they will be able to apply then later to real-life situations."
   "This method helps students relate ideas together and can be of great help in dealing with real-life problems."
Critical discourse assesses the adequacy of rationales offered within the realm of justificatory discourse or assesses the values embedded in the form and content of curriculum materials and instructional practices (the hidden curriculum).

Examples:
"The teacher was very gender-biased. She never called on the girls."
"The teacher presented the lesson in a way that was not biased against other cultures."

Definitions are based upon Zeichner & Liston (1985). Examples are taken from student essays produced during the field test of the pre- and posttests.
BIBLIOGRAPHY


