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A PHILOSOPHICAL ANALYSIS

OF

TEACHER CLARITY

DISSERTATION

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

By

William D. Armaline, B.A., M.A.T.

* * * * *

The Ohio State University

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To Bill and his grandparents,
Jim and Rosemary
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CHAPTER ONE

PROBLEM STATEMENT

Teacher clarity research is a program of inquiry nested within two progressively larger concentric circles — teacher effectiveness literature and literature on teacher education. Given this nesting, much of what passes as knowledge at the innermost circle is set by those rings at outer layers. To introduce the present study, it is therefore necessary to address, albeit briefly, the state of research and knowledge in teacher education as a unit of study, followed by that of teacher effectiveness research. With the above addressed, the present line of inquiry will be set in historical and epistemological perspective, thereby allowing critical synthesis and evaluation.

The present study attempts to pull together two divergent lines of research — teacher clarity and inhibitors to teacher clarity — that have common ancestry in the review of teacher effects
research done by Rosenshine and Furst (1971). This study, as a synthesis, represents a step in the direction of explicating the characteristics, traits, behaviors, and dispositions of teachers who are better able than most to bring about student learning.

A Model of Research on Teacher Education

The quality and quantity of research on the education of teachers has been assessed repeatedly as being less than adequate (Feldens, 1982; Proceedings, 1981; Tucker and others, 1981; Watts, 1982). There seems to be a number of reasons for this unsatisfactory state-of-the-art of inquiry into teacher education:

... the culture of teacher education that, to a large extent, is based upon professional wisdom, common sense, and commitments; lack of aptitude for or training in inquiry by teacher educators; absence of time, support, and reward for inquiry; the promotion of inquirers into unrelated positions; the near-absence of vehicles that encourage and transmit scholarly knowledge; the commonly held belief that teacher education is too complex a phenomena (sic) to be successfully studied; and perhaps most notably the absence of paradigmatic communities of teacher education researchers. (Cruickshank, 1984, p. 43)
Cruickshank goes further to say that at least one reason for the sad state of teacher education inquiry is the lack of a model shared by researchers that might serve to lay out the topography of the field; there is no commonly held paradigm, no real sense of "normal science" for research in teacher education.

When one undertakes the task of trying to understand the workings of complex phenomena, it is often useful to construct a model, a simplified version of the overall structure that lays out the component parts and allows for initial attempts at determining the relationships between and among those parts. The most all-encompassing and general of the concentric circles of study alluded to earlier is that comprising inquiry into teacher education. Given the recognized usefulness of models in the study of teaching behavior (Dunkin and Biddle, 1974), it is interesting that, to date, no model of teacher education has been developed and widely discussed.

Cruickshank (1984) made the above point and proposed a model-in—formation as a starting point. In this model, he lays out the primary variables that come to play in teacher education, and he
posits lines of interaction and makes suggestions regarding the place inquiry on effective teaching (the second most general concentric circle) takes in the generalized schema.

The first variable of concern contains the "principals", made up of teacher educators (educationists, academicians, and local education agency personnel) and teacher education students (preservice teachers).

The "contexts" within which the principals function are basically two: the college campus and the field/school setting. While there are differences in terms of the particulars of the settings and the relative amount of time different principals spend in each, there is also remarkable similarity in how teaching and learning take place. College classrooms are run much the same as K-12 classrooms, with expository instruction predominating at all levels.

The principals interact in ways set out by the next element of the model, the "curriculum", including general studies and various types of professional studies (see NCATE, NASDTEC for examples of possible breakdowns). Further, there are a number of "instructional strategies" or
alternatives, some on-campus and some in the field, that have the intent to yield "outcomes" of the teacher education program. Generally speaking, these outcomes point toward developing a sufficient number of reasonably well-trained practitioners for the public schools. (Obviously, the problem of what is to count as 'good teacher', coupled with what level of quality one can expect from a bachelor-level training program, adds to the vagueness of 'reasonably well-trained'.)

The above array of model elements (teacher educators, preservice teachers, contexts of teacher education, curricular contents, instructional alternatives, and outcomes) can be used to develop a definition of teacher education. Using Cruickshank's words,

...preservice teacher education can be defined as the engagement of teacher educators (broadly conceived to include education professors, cooperating teachers, academicians) and preservice teachers in instructional interactions -- with each other and with the curriculum -- that occur both in tertiary institutions and in K-12 contexts, the intention being to provide opportunity for those aspiring teachers to acquire abilities sufficient to enter the profession. (Cruickshank, 1984, p. 44)

While the above serves as a beginning point for teacher education model-building, it is
recognized that a number of factors (e.g., the
philosophical nature/purpose of the school and the
teacher's role therein) are not addressed. With
the caveats of over-simplification recognized, a
model is presented in diagramatic fashion
represented in Figure 1.

The model proposed, primitive and still
unfolding, is useful to lay out the terrain of
research in teacher education. Each of the five
explanatory variables has attributes, or "attendant
characteristics", a taxonomy of which is found in
Cruickshank, 1984 (pp. 45-46). It is assumed that
the five variables influence in some way the
outcome variable (the program graduate), as well as
interact to influence one another, as depicted in
Figure 2.

Given the above, and given that the model does
seem to account for the research carried out in the
field in terms of variables studies (Cruickshank,
1984, p. 47), we might use this model to begin the
process of theory-building, the organizing of
facts, concepts, definitions, and conditional
propositions (Smith, 1969) with respect to the
teacher education enterprise. Further, the
variables arrayed serve as suggestions for research
1. **Teacher educators** (campus and field-based, including education professors, academicians, cooperating teachers)
2. **Teacher education students** (preservice teachers)
3. **Contexts of teacher education** (campus and field)
4. **Content or curriculum of teacher education** (general education and professional studies)
5. **Instruction and organization in teacher education** (instructional and organizational alternatives)
6. **Outcomes of teacher education** (sufficient and effective teachers)

**Figure 1. Six Primary Variables Extant in the Field of Preservice Teacher Education**
1. Teacher educators  
2. Teacher education students  
3. Contexts of teacher education  
4. Content or curriculum of teacher education  
5. Instruction and organization in teacher education  
6. Outcomes of teacher education  

Figure 2. Supposed Relationships and Direction of Relationships Between and Among Primary Variables Extant in the Field of Teacher Education
programs, those extended and related series of studies that have been so valuable in the natural sciences and so conspicuously absent in educational research. For example, one might extend the process-product research designs of effective teaching studies to the study of teacher education to help determine how best to achieve specific outcomes in terms of preservice teacher learning. One might also use the model as a framework to look more closely at selection of preservice candidates as well as at exactly what outcomes are of importance to the preparation of public school teachers.

Models of Teaching and Related Research

Narrowing the scope of interest a bit, it is now appropriate to focus on the act of teaching, with an attendant model, as one aspect of the curriculum component of the teacher education model above. The model of teaching developed by Mitzel (1960) and refined by Dunkin and Biddle (1974), depicted in Figure 3, presents four categories of variables that have been used to study the
Figure 3: A Model for the Study of Classroom Teaching (Reproduced from The Study of Teaching by Michael J. Dunkin and Bruce J. Biddle, 1974, p. 35).
teaching/learning process.

The first category, **presage variables**, relates to the background characteristics of teachers. Subcategories of presage variables are: teacher formative experiences (social class, age, e.g.); teacher training experiences (university attended, teaching practice, inservice experiences, e.g.); and teacher properties (personality traits and characteristics, motivation, intelligence, e.g.).

The second category is that of **context variables**, which includes the conditions to which the teacher must adjust. The context encompasses the formative experiences of pupils, pupil properties (ability, attitude, e.g.), school and community properties (e.g., size, ethnic composition, facilities), and classroom contexts (e.g., class size, media equipment, textbooks).

The third category is composed of **process variables**, which relate to what is actually done in the classroom by teachers and students. This includes teacher classroom behavior, student behavior, the interaction between teacher and student behaviors, and immediate changes in student behavior.
Finally, the **product variables** are seen as the outcomes of teaching and include pupil growth in terms of subject matter knowledge, attitudinal change or reinforcement, and longer-term pupil effects regarding things such as professional or occupational skills and concerns. It is assumed that these outcomes are primarily a result of an interaction of the explanatory variables, just as is the case in the Cruickshank model above.

The yield of research on teacher effectiveness that follows the model is discussed in Chapter II, as well as is the need for modification and refinement to account for the complexity of the subject of study (e.g., Doyle's 1977 suggestion regarding intervening variables). What is important here is that the research reviewed tends to fall in line with the model (especially with modifications such as those put forth by Doyle). While the model is useful as a guide to research, one must be concerned that research is not limited by or distorted to fit the model. Questions of measurability of outcomes are important, but one must be wary of "measurability" limiting outcomes of interest. Put differently, perhaps other, complementary models ought to be proposed such that
the limits of one model are addressed by the others, yielding multiple metaphors of the teaching/learning process.

What follows is a drawing together of two lines of research emanating from the seminal research review of Rosenshine and Furst (1971). The research is examined conceptually and operationally in its entirety in an attempt at synthesis, the specific purpose of which is a better understanding of what is and is not covered by the research, and, more generally, the enhancement of our understanding of the teaching/learning process and the endeavor of teacher education.

Using Cruickshank's model-in-progress, the results will add to knowledge that might become a part of the content of the teacher education curriculum, the knowledge base for preparing preservice teachers. Further, the analysis provided will indicate limitations to the lines of inquiry that are important to any consideration of schooling policy. Given the present state of public concern and clamoring for action in schools, reflection on what the research addresses and does not address is critical.
The Study

Since two rather distinct research programs have emanated from the Rosenshine and Furst (1971) review, leading, as it were, in two opposite low-inference directions (clarity and inhibitors to clarity), it is of benefit to determine the relationship between the two programs. A number of problems present themselves in each line of inquiry individually, centering on what, exactly, is being studied. In clarity research, one is looking most generally at the effect of low-inference indicators of achievement and satisfaction. The operational definition of clarity, derived from empirical work described in Chapter II, may or may not be what one ordinarily means by 'clarity' conceptually. That is, the operational definition might be broader (or narrower) than the concept of 'clarity' in ordinary language. In fact, it might be that 'clear teacher' is simply to be read 'good teacher', thereby begging the whole question at issue (How does clarity relate to effective instruction?).

Second, similar questions might be asked about inhibitors to clarity, as opposed to operational
definitions developed in the line of inquiry
discussed along with clarity research in Chapter
II. One obvious problem is that 'vagueness' and
'inhibitors to clarity' are often used
interchangeably, although they are not identical
concepts. Further, low-inference indicators of
'vagueness' may outstrip (and/or fall short of) the
concept, as was a possibility in the clarity
research.

Third, conceptual clarification is needed
between 'clarity' and 'vagueness' (and 'ambiguity')
and their relationship to one another. Is the lack
of vagueness and ambiguity a sufficient condition
for the existence of clarity? Put in different
terms, what might a philosophical analysis show
with respect to the relationship between 'clarity'
(and related concepts) and 'vagueness' and
'ambiguity' (and all they entail)?

Finally, are 'clarity' and 'achievement'
defined independently of one another, both
explicitly and implicitly? If not, again one runs
the risk of question-begging.

The above serves as a preface to the central
focus of the study. What, conceptually, is the
relationship between two lines of inquiry emanating
from the Rosenshine and Furst review, which itself is nested within the ever broadening circles of teacher effectiveness literature and global study of teaching and schooling in teacher education programs? What can one glean from this research for teaching and for teacher education? What related issues of importance are not addressed?

**Research Questions**

1. How is 'teacher clarity' defined and used within the present research program?

2. How is 'teacher clarity' ordinarily used by informed speakers of the language?

3. How, if at all, do these two uses differ?

4. Of what significance is the difference?

5. How is the phrase 'inhibitors to clarity' (including 'vagueness' and 'ambiguity') used in the research?

6. Does 'inhibitors to clarity' (including 'vagueness' and 'ambiguity') have other philosophical and/or ordinary uses?

7. How do these differ?

8. Of what significance is the difference?

9. What is the relationship between 'clarity' and 'inhibitors to clarity' (including 'vagueness' and 'ambiguity') in the research and in ordinary usage?
10. What of significance is left out of the picture by adopting the research approach discussed above?

11. What might we now say about the research support given to 'clarity' by the earlier studies reviewed by Rosenshine (1971) and by Rosenshine and Furst (1971)?

**Delimitations**

First, we are looking at 'clarity' as it relates to instruction (conceptually) and, even more narrowly (in the empirical research) as it is perceived by students. We are not looking at clarity in all its forms, everywhere it is found.

Second, this is not an empirical study; no new data are generated or analyzed. Rather, conceptual criteria for use of relevant terms are developed in an attempt at framing the empirical research, thereby facilitating the theory-building process.

Third, methodological limitations are noted and discussed more fully in a section of Chapter III ("The Limits of Conceptual Analysis").

Fourth, in terms of outcome measures of importance in the empirical research used here, we are limited to those measures as they stand. One problem that goes unaddressed, at least initially,
is the limited view of 'achievement' found in the research. This is addressed more fully later in the analysis.

Fifth and finally, the primary intent here is not in prescribing how one ought to teach. The analysis points only at what might count as 'clear teaching'. If there is any prescription involved, it lies in prescribing how one might improve the research and theory-building process by combining both empirical and philosophical analyses.

**Definition of Terms**

*High-inference behaviors*: Those (teacher) behaviors that require observers or raters to make judgments as to their quality and/or occurrence in the classroom (e.g., "teacher is clear").

*Low-inference behaviors*: Those (teacher) behaviors that can be observed and counted with certainty in the classroom situation (e.g., "uses examples when explaining").

*Operational inhibitors to clarity*: Those low-inference teacher behaviors found empirically to disrupt teacher-to-student communication in lecture presentations.
Operational teacher clarity: Those low-inference teacher behaviors found empirically to be constituents of the high-inference construct (clarity), in particular by Cruickshank et al., Bush et al., Kennedy et al., and Hines.

Philosophical analysis: The application of techniques designed to provide for clarification and justification (Chambers, p. 1). Philosophy applied to education involves the "disciplined demarcation of concepts" and "the patient explication of the grounds of knowledge and of the presuppositions of different forms of discourse" (Peters, p. ii). Subgroupings include, but are not limited to, logical analysis, conceptual or linguistic analysis, and ordinary language analysis. For further information, see Chapter III of this study.

Programmatic definition: The definition of a term such that accepting the definition implies the accepting of a particular program, plan of action, or point of view surreptitiously included in the definition. Other names include "persuasive" and "loaded" definitions. For further information, see Chapter VI of this study.
Reportive/descriptive definitions: The definition of a term such that established use is mirrored. Reportive definitions are the type most frequently encountered in dictionaries. For further information, see Chapter VI of this study.

Stipulative definitions: The definition of a term such that vocabulary is increased and utterance abbreviated for the duration of a particular discourse. No attempt need be made to mirror established use, if in fact an established use for the term even exists. The user of the definition need only announce the intended meaning to be employed for the duration of the particular discourse. For further information, see Chapter VI of this study.

Teacher clarity: Also referred to as "clear teaching" and "clarity", 'teacher clarity' is "a state in which a teacher who is in command of the subject matter to be transmitted is able to do that which is required to communicate with learners successfully" (Hines et al., p. 88).
An important distinction in philosophy is the use/mention distinction. This has to do with being able to use words to talk about things in the world as well as about words themselves. More precisely, we use words to talk about things in the world, but what do we do if we want to talk about the words themselves? Obviously, we cannot use the same words. We need a way to name or mention words to help distinguish between using words to talk about the world (object language) as opposed to using words to talk about words (meta-language).

A convention often employed by philosophers is the placing of inverted commas (or single quotation marks) around the word about which we wish to speak. For example, if someone were to wish to describe a teacher's behavior as being clear, there is no need to employ inverted commas, as the terms employed function in object language. If, however, we wish to speak of the term 'clear teaching', inverted commas are used to indicate (mention) that the phrase is to be understood in terms of meta-language. We are now using words to talk
about words.

This distinction may be illustrated further by two questions, each employing the same words in the same order, but with one using object language only and the other using meta-language. If one were asked, "What is the meaning of life?", how might one respond? Perhaps one might delve into a deep discussion of man's purpose on earth relative to all humanity, to some deity, and so on. To answer thusly is to respond to the question in terms of object language.

If the question were written, "What is the meaning of 'life'?", the focus changes from object language to meta-language. Now, the employment of the term 'life' is the subject of interest; we are to use words to talk about a word ('life'). It is likely that the response would focus on defining 'life' as a term in the English language.

The inverted comma convention allows us to avoid the possible ambiguity between object language and meta-language, and it will be used throughout this study. For further discussion of object language versus meta-language, while employing a different convention, see Munson (1976, pp. 12-16).
The reason for employing inverted commas rather than quotation marks is primarily to avoid confusion with direct quotes and with scare quotes. Some philosophers (Munson, e.g.) do use quotation marks instead of inverted commas, however.
CHAPTER TWO
LITERATURE REVIEW

Introduction

The intent of this review of related research is first, to paint in broad strokes the picture of research on teacher effectiveness as it has developed, to provide a backdrop for the present line of inquiry. Second, and more specifically, this review will focus on more recent and detailed efforts to establish a line of inquiry within teacher effectiveness literature, the research on the effect of teacher clarity on desirable student outcomes such as achievement and satisfaction.

It must be stated at the outset that, while research on the effects of schools and teachers in them has a history stretching over at least the last 50 years, few efforts prior to 1960 yield results of enduring value. As late as 1971, Rosenshine and Furst, in their now-famous review of research extant in the field, claimed
This review is an admission that we know very little about the relationship between classroom behavior and student gains. It is a plea for more research on teaching. It is also a plea to educational researchers and to teacher educators to devote more time and money to the study of classroom teaching. ...sufficient information is not available on the relationship between a teacher’s behavior and student learning in the classroom to design adequate programs of teacher education. (p. 37)

Historical trends in effectiveness literature can be illustrated or categorized in a variety of ways. The mode here is centered on the changing focus on independent variables of interest in the studies.

Presage Variables as Correlates of Effectiveness

The earliest studies on teacher effectiveness looked at personality trait measures of teachers as they correlated with teaching performance, usually described in terms of administrator or peer judgments of teaching success. There are a number of reasons why these studies failed to yield meaningful results. The independent variables (attitudes and personality characteristics) are difficult to define in any operational sense; and there is likely to be little agreement regarding
rater assessment of these attributes, making precise replication difficult if not impossible. Further, the dependent variables are suspect, in that there is no empirical connection as yet established between administrator/peer evaluations as above and any meaningful educational outcomes such as student achievement (Harris, 1969).

Getzels and Jackson (1963), as quoted in Hines (1981) echo the above, summarizing the importance of this line of research as follows:

For example, it is said after the usual inventory tabulation that good teachers are friendly, cheerful, sympathetic and morally virtuous rather than cruel, depressed, unsympathetic and morally depraved. But when this has been said not very much that is especially useful has been revealed. For what conceivable human interaction — and teaching implies first and foremost a human interaction — is not the better if the people involved are friendly, cheerful, sympathetic and virtuous rather than the opposite? (p. 574)

Similar findings are stated elsewhere (Averch, Carroll, Donaldson, Keisling and Pincus, 1971, e.g.), as noted by Hines (1981). Presage variables alone are of little help, especially when paired with meaningless dependent variables. One obvious problem with these earlier studies is the lack of theoretical guidance; there is little or no a
priori connection between universal personality traits and successful teaching. Similarly, the conduct of the research is not marked by critical experiments designed to eliminate alternative hypotheses. In the words of Platt (1964), the conduct of educational research is not representative of "strong inference". Dunkin and Biddle (1974) concur, seeing little to be gained in this line of inquiry.

**Process Variables as Correlates of Effectiveness**

The studies in this category are both fewer in number and of more recent origin. These studies attempt to connect teacher behaviors with student learning, thereby avoiding problems associated with the interpretation of universal traits as independent variables and the meaninglessness of administrator/peer ratings on the dependent variable side. Medley and Mitzel (1959) found very few studies that fit this pattern, but nonetheless viewed the move to process-product studies as potentially fruitful for teacher effectiveness and teacher education.
Rosenshine and Furst (1971) found only sixty studies (ten experimental and fifty correlational) that fit the process-product paradigm, connecting teacher "processes" with student achievement "products". Even by 1976 Rosenshine found a relative dearth of studies fitting the model that, seventeen years earlier, Medley and Mitzel claimed showed so much promise.

The Rosenshine and Furst Review

Rosenshine and Furst reviewed process-product studies that attempted to identify relationships between process variables (teacher classroom behaviors) and student outcomes (product variables). The purpose of the review was to determine what teacher behaviors seem to be related to student learning so that those behaviors could be studied further and ultimately become incorporated into the curriculum of teacher education as skills to be mastered.

They cited a number of limitations of this collection of studies. The studies were done in classrooms with normal children, and usually used only class mean scores in the analysis, allowing for little breakdown of achievement by subgroup.
In addition, they focused on general teaching behaviors hoped to be effective across subjects and age groups, and were not subject- or age- specific. Finally, the studies correlate teacher behaviors with student achievement, ignoring other potentially important dependent variables.

The results of analysis pointed to five process variables which have good research support (clarity, variability, enthusiasm, task-oriented and/or businesslike behavior, and student opportunity to learn criterion material). Six additional variables were supported as well, but less conclusively. They are: use of student ideas and general indirectness, criticism (negatively correlated), use of structuring comments, types of questions (high versus low order), probing, and level of difficulty of instruction. A number of variables previously thought to relate to achievement received no support (e.g., praise, warmth, nonverbal approval).

Given the above findings, and in light of the pressure from many sources on teacher education toward establishing competency or performance based teacher education programs, Rosenshine and Furst encouraged: (1) looking for other variables of
promise using some of the many teacher observation
instruments available; (2) determining the effects
of variables relating to curriculum and instruction
materials (perceived purpose, cueing, practice,
knowledge of results, e.g.) on student achievement;
(3) trying to move from high to lower inference
variables in studies of teaching; (4) improving the
observational systems used to study teaching; (5)
using multiple observational systems simultaneously
to code concurrent events; (6) taking timing and
sequence of behavior into account, along with
frequency of occurrence; (7) relating classroom
context variables to process variable effects; (8)
using studies that employ greater control over
classroom variables over shorter periods of time;
(9) relating teacher behaviors to personality
type/learning styles in addition to class mean
gains on tests; and (10) moving to experimental
studies employing the most promising of the
variables gleaned from the above.

The Heath and Nielson Criticism

The research review reported above came under
severe criticism, most notably by Heath and Nielson
(1974). They too were concerned that the research
on relationships between teacher behaviors and student achievement was not and, as yet, could not be the basis for competency or performance based program development. Further, they saw Rosenshine and Furst muddying the waters with a research review that was seriously flawed. More recent reviewers generally concur (Hines, 1981; Cruickshank and Kennedy, 1985).

Heath and Nielson analyzed forty-two of the studies cited by Rosenshine and Furst over seven characteristics: (1) criteria of achievement, (2) operational definitions of teaching behaviors, (3) statistical results, (4) legitimacy of statistical tests, (5) sample characteristics, (6) study conditions, and (7) comparability of groups. The results of their analysis indicate that many citations in the Rosenshine and Furst review did not report testing the assumption of linearity (78%), randomization (83%), statistical control for initial abilities or sufficient information for judgment to be made, disposition of statistical outliers (74%), testing normality assumptions (77%), and testing homogeneity of variance (87%). Significant relationships between the variable in question and the criterion measure were claimed in
44% of the reports, while 56% did not claim significant results. In addition, Heath and Nielson found operational definitions with little in common grouped as examples of a single teaching variable, definitions reflecting a traditional lecture-discussion view of teaching, weak research designs, and the ignoring in the studies of what is taught and who is taught.

Heath and Nielson conclude that the research does not offer the level of support claimed by Rosenshine and Furst for the eleven variables. This is the case largely because of "sterile" operational definitions of teaching and "shallow definitions" of achievement, weak designs, and failure to consider other well-established context variables like socio-economic status and ethnicity. Hence, the "effects of techniques of teaching on achievement...are likely to be inherently trivial" (p. 481).

It must be recognized that, while Heath and Nielson make claims that are both severely critical and well-founded, Rosenshine and Furst openly admitted many of the failings cited above. Yet this research review must be viewed in its historical context. It is an attempt, albeit
flawed, at integrating disparate literature connecting teacher behavior and student achievement. As such, it lays the basis for research that is reviewed below, including the specific line of inquiry extended in the present study. The drawbacks have also led, it would seem, to a discussion of problems of research in teacher effectiveness generally, contributing to the meager yield of useful theoretical knowledge of the teaching/learning process.

Multiple Variables as Correlates of Effectiveness

More recently, reviews of research on teacher effectiveness have yielded more consistent and promising results than those of Rosenshine and Furst. The studies reviewed date from the early 1970's, and they seem to have benefitted from the Rosenshine and Furst/Heath and Nielson debate. The reviewers of these studies (e.g., Borich, 1979; Brophy, 1979; Cruickshank, 1976; Gage, 1978; Good, 1979; Medley, 1977; Powell, 1978; Rosenshine, 1976; and Rosenshine and Berliner, 1978) find that designs are more complex and better suited to the problems studied, the studies themselves are better
conceptualized, and the conduct of the studies continues to improve.

In addition to the above technical improvements, there also seems to be a pragmatic improvement in terms of results obtained (see Rosenshine and Berliner, 1978, e.g.). One characteristic that sets these later studies off from the earlier ones is the use of a multi-factor structure (and not a two-factor, process-product structure), including combinations of the following independent variable categories: (1) student context variables such as socio-economic status, content area, and grade level; (2) student process variables such as engaged time or time-on-task; (3) teacher process variables (many as stated in earlier research, but more refined); and (4) presage variables, studied in conjunction with some student outcome measure(s) serving as dependent variables.

The reviewers above find results that point rather consistently to patterns of teacher behaviors (rather than single behaviors) combining with student process and context variables to yield differential student outcomes. Yet, even with the improvements made in the mid-to-late 1970's, there
are still a number of limitations in the research. The most glaring problem or shortcoming is that nearly all of the studies deal with elementary mathematics, reading, and language arts, to the exclusion of other grade levels and content areas. What follows immediately is a brief review of persistent teacher effectiveness research problems.

**Impediments to Conducting Research on Teaching**

Dunkin and Biddle (1974) approach the question of impediments to conducting research on teaching, stating that the early research on teaching effectiveness (pre-1960) failed in a number of ways, the most important of which are the failure to observe actual teaching activities, the lack of concern for contextual effects, the lack of a theoretical framework to guide research, and inadequate criteria of effectiveness.

With regard to observation of teaching and increased recognition of contextual factors, great strides have been made. We no longer depend upon administrator evaluation of effectiveness; the classroom has moved from being a "black box" to being more like a fishbowl. Contextual factors
also play a much greater role in more recent studies of teacher effectiveness, as seen by the patterns for different age and socioeconomic status levels and content areas (Medley, 1977).

The remaining two, theoretical guidance and criteria of effectiveness, have been addressed less adequately. Dunkin and Biddle add to this list problems of measurement, sampling, design, and interpretation. Berliner (1976) concurs, citing the additional need to consider instrumentation, methodological, and statistical problems.

Theoretical knowledge, according to Smith (1969), consists of concepts, definitions, facts, and conditional propositions. A theory organizes the above in an attempt to describe and eventually explain some phenomenon. Theoretical organization allows for systematic procedures of verification; and, when tested, if the theory is found to be an adequate explanation, knowledge of the subject is enhanced and further research can build upon the result.

Unfortunately, research on teaching traditionally has not tested theory, but rather has operated on the shotgun method, correlating factors such as eye color and dress with learner outcomes.
There seemed to be a felt need neither for a priori, theoretical support nor for a posteriori evidence that these factors had any connection to teaching. It was not until Mitzel's (1960) model (elaborated and made visual by Dunkin and Biddle, 1974) that a theoretical research design took shape. Model variations, elaborations, and corrections are still needed, but at least research has been given direction. McDonald (1976, p. 10) has an alternative model developed from the Beginning Teacher Evaluation Study, and Cruickshank (1984) has developed a model for research in teacher education, extending the theoretical framework within which to conduct research.

Dunkin and Biddle's call for adequate criteria of effectiveness centers on choice of dependent variables. Berliner (1976) questions the validity of using standardized tests. In addition, he expresses the need for developing tests for special teaching units and tests that measure multivariate outcomes (achievement and satisfaction, e.g.). With regard to context variables, Berliner sees student background, subject matter, normative standards and volunteer samples, individual differences among students, mediating factors tying
teacher effectiveness to student behavior, construct validation, and generalizability of findings as examples of factors that need to be considered in conjunction with the choice of dependent variables.

Likewise, Dunkin (1976) sees a problem with using standardized tests as product measures, as they may be insensitive to the teacher (process) variables. In addition, many tests that emphasize conventional psychometric procedures maximize individual differences and minimize between-school differences. Depending upon the choice of unit of analysis, this can alter the yield of evidence for teacher (process) behaviors affecting achievement (product) scores. He also stresses the need for uniformity in terminology, a factor in Howsam's "professional culture" (1976), and the misuse (and unmanageable number) of observational systems.

A central issue related to the problem of dependent variable choice goes beyond the schools, however. Outcomes intended are matters of social policy; what does society want from its schools? Brophy (1979) emphasizes this point, stating that research "can provide information about the linkages between variables...but it cannot order
outcomes in priority; this is a question of social policy rather than science" (p. 746).

A third problem is that of instrumentation. This was alluded to in the discussion of the use of standardized tests to measure achievement. Along these lines, Brophy (1979) alerts us to the need for reliable and valid tests of affective outcomes as well. Further, one must be concerned with how data are gathered. Questions raised by the possibility of observers intruding and thereby disrupting classroom events, the problem of observer bias, the question of the most effective use of technical equipment, the ability of measures to reflect multivariate outcomes, as well as short-term versus long-term results are all important in this regard (Dunkin and Biddle, 1974; Berliner, 1976).

Kennedy and Bush (1976), recognizing research shortcomings, list a number of design improvements to deal with many of the above problems. They suggest using nested variables within hierarchical designs, treating achievement scores as repeated measures, and following up fixed variables with eta-squared or omega-squared techniques to estimate relative contributions of the context variables.
under observation. In addition, the use of analysis of covariance, blocking variables, and repeated measures as alternatives to change scores could avoid what they see as frequent incorrect calculations which result in misinterpreting results of the studies.

Brophy (1979) suggests a number of design changes, as well. Smaller units of analysis (teacher as opposed to school or district), proper sample size for meaningful analysis, use of pretest-posttest rather than posttest only designs, use of a variety of high- and low-inference variables (combining ethnographic study with systematized low-inference study), and use of multiple dependent variables are among the most prominent. In addition, Dunkin (1976) sees the lack of random assignment of subjects to groups as a design problem. He adds that there is a need for more long-term research, more follow-up studies, and better integration of teachers into the research process.

The problems of interpretation follow directly from the above-mentioned methodological and design problems. Erroneous interpretation can result from the lack of randomization (assignment of subjects
and treatments to groups for internal validity and selection of samples from the population for external validity), inappropriate sample size (affecting significance and strength of relationship), inappropriate statistics, weak designs, and nonlinearity when linearity is assumed. Even though designs have improved greatly in the past twenty years, as can be seen from the above more improvement is still desirable.

Since many of the articles in the teacher effectiveness literature are actually reviews of several studies, a few notes about the inadequacy of the review process seems appropriate. The main error in most reviews according to Gage (1978) is of the Type II variety. That is, there is a tendency to accept the null hypothesis when it actually ought to be rejected. The reviewers emphasize such high levels of significance that important results go undetected. He also points out that flawed studies can yield important findings if combined with unflawed studies or those that are not flawed in the same direction. Throwing out studies can be a waste of valuable data.
Jackson (1980) also points to inadequacies in review articles, stating that the major problem is the lack of systematic review methodology. This creates a number of problems. First, this lack of methodology probably means that social scientists have neglected this area, thus limiting the power and effect of reviews of research. Second, it is difficult to evaluate reviews. Third, it is difficult to train people to do adequate research reviews; and fourth, "the lack of review methods hinders the accumulation of valid knowledge from previous research" (p. 440). The reviews therefore often reflect the commitment of the reviewers, to use Dunkin and Biddle's terminology.

Jackson and Gage both see the work of Glass regarding meta-analysis as a promising alternative to present non-methods. Glass has developed a method to transform findings of separate studies into a common metric, a standard score of sorts, allowing for traditional statistical procedures to determine effects. The unit of analysis is the study itself, "and summary data from each study are analyzed" (Jackson, p. 451). This approach is systematic, clearly articulated, and able to be replicated; it can use data from good as well as
flawed studies; it can provide parameter estimates; and it provides a means to analyzing the relationships among the methods of the various studies (Jackson, p. 452).

Limitations include the need for direct evidence, the inability to infer causality, the need for primary studies being a sample of a population and for use of multivariate statistics, the decision of whether a set of studies is to be considered a universe (population) or a sample, and finally the possibility of not finding common metrics. Given these limitations, however, the Glass approach is perhaps the most promising approach to reviewing research to come along, and as such is a noteworthy research advance. Combined with the above suggested research improvements, the scientific, theoretical base for teaching and teacher education can be expanded to bring us closer to teaching being "considered more scientific and characterized less as 'school-keeping'" (Cruickshank, 1976, p. 60).

A final issue with respect to process-product studies is the incomplete nature of the paradigm. Doyle (cited in Gage, 1978) claimed that the paradigm is flawed in a number of ways (flows in
only one direction, sees the teacher as primary, ignores pupil responses and interpretation, to name a few) and proposed two alternatives. One is the mediating process paradigm and the other is the classroom ecology paradigm. Both posit intervening steps lying between teacher process behavior and student product (outcome).

In the mediating process design, student processing of the teacher behavior comes between what the teacher does and the final outcome, adding the possibility of interaction and two-way flow as well as a more active role for the student. Similarly, the classroom ecology model posits active students who are engaged in the act of figuring out what they have to do to succeed in the class. The teacher gives a number of clues; some are clear, some are not (smiles, praise, punishment, grades, e.g.). It is the job of the student to sort and to interpret those cues. The ability of the student to do this greatly enhances the ability to perform the tasks needed for good outcome measures.

Medley (1977) sees the same inadequacies, stating that teacher education must look at what is happening with students, their learning experience,
to understand fully resultant outcomes. Rosenshine and Berliner’s (1978) call for academic engaged time being viewed as a dependent variable of direct instruction is not enough. What fills the time, what are the student’s experiences? These questions must be addressed, and that is the purpose of the above models.

One additional word regarding context is in order. Teacher education and teacher effectiveness research define ‘context’ too narrowly. The broader socio-political context, structurally speaking, must also be addressed if one wants a fuller understanding of why teachers are effective with students (or why they are not effective). The ethnographic work of Paul Willis in Learning to Labour (1977) is an excellent example of the interaction of cultural context and classroom context/process with respect to student outcome measures of success. Lortie’s work is another example; we need more sociological and political focus in research on teaching (context).

In sum, better technique and conceptualization are needed, that is clear from the above; and movement is evident. We also need to expand our horizons beyond the dominant paradigm of research
on the individual (what Haberman, 1981, called the educational psychology dominance). We need to broaden our scope to other ways of knowing. In particular, sociological perspective is lacking in educational research. We do not know how Lortie's (1975) "dominant ethos" of conservatism, presentism, and individualism affects teaching and teacher effectiveness. We do not know how those people who self-select into teaching interact with the program. In fact, we do little to see how the programs of teacher education relate to teacher effectiveness literature (program validation concerns of Medley, 1978). We need to study the active role of the student in this process, also.

Given the above history and review of teacher effectiveness literature writ large, the scope is now narrowed to the study of a particular variable - teacher clarity. The reason for the clarity focus is twofold. First, it is intuitively obvious that clarity and understanding are linked. Second, empirical studies support the intuitive connection.
Review of Research Relative to 'Teacher Clarity'

Throughout the research on teacher effectiveness, teacher clarity maintains a position of prominence as a variable of interest in terms of higher student achievement scores. There is a variety of ways to organize the research that supports a clarity/student achievement link. Hines (1981) used a three-way breakdown of molar (high-inference) descriptors of clarity, low-inference clarity constituents, and low-inference inhibitors of teacher clarity. The approach used here is similar, overlapping in many important ways with the Hines schema. Yet, there are a few differences. The organization here is primarily historical; and, while high- versus low-inference studies tend to fall out in similar order, there are exceptions (Hiller, et al., 1969, e.g.). Further, more of the earlier studies reported in Rosenshine and Furst (1971) and Rosenshine (1971) are reviewed here than is the case in the Hines study.

The first group of studies is that which is revealed by a close examination of the Rosenshine
and Furst (1971) and the Rosenshine (1971) reviews. Rather than the seven studies reviewed by Hines, nine are reviewed here (ten if the Wallen, 1966, study is counted as two separate studies — not done that way by this reviewer).

The second major grouping is the line of research that seems to flow out of the Hiller et al. (1969) study, which was reported in Rosenshine and Furst (1971) and looked at low-inference inhibitors to teacher clarity. These descendent studies of Hiller et al. are often referred to (inappropriately) as the "vagueness" studies, also. The intent here is, first, to review the line of research as representative of a significant outgrowth of the Rosenshine and Furst (1971) claims regarding the promise of "teacher clarity" as a correlate of student achievement; and second, to pave the way for an attempt at synthesizing the results with the further investigation of low-inference teacher clarity (the third major grouping reviewed) such that the concept of 'clarity' might be better explicated and subsequently studied empirically.

The third grouping, low-inference indicators of clarity, is the final set of studies discussed
here. It is made up of a central core of studies done at The Ohio State University under the guidance of Cruickshank and Kennedy. The original clarity work has been extended at Ohio State and elsewhere, with the focus on operationalizing 'clarity' and relating clarity ratings to student achievement and student satisfaction with the teaching. The present study is one of the most recent in this third grouping.

**The Early Studies**

The majority of studies that directly or indirectly measure relationships between clarity and student achievement prior to 1971 are high-inference, correlational studies. They are: Belgard, Rosenshine, and Gage (1968); Fortune, Gage, and Shutes (1966); Fortune (1967); Wallen, first and third grades (1966); and Chall and Feldmann (1966). Another study, that by Morsh, Burgess, and Smith (1955), was unavailable for study and will be discussed here from secondary sources. The exceptions to the high-inference correlational studies are: Hiller, Fisher, and
Belgard, Rosenshine, and Gage (1968)

The Belgard, Rosenshine, and Gage (1968) study was one of a group of studies done by Stanford researchers (Gage, Belgard, Dell, Hiller, Rosenshine, and Unruh) to examine teacher effectiveness in explaining, a component of teacher behavior deemed to be critical to instruction, with what they called the "micro-criteria" approach to effectiveness (p. 3). This approach differs from more global views of teacher effectiveness in that smaller, more specifically defined aspects of teacher effectiveness whose components are less complex are analyzed in the hopes of detailing relative effects on student achievement across levels or frequencies of the variable of interest (here, "explaining behavior").

Belgard et al. defined 'explaining' operationally as "the ability to present ideas in such a way that the pupils would be able to respond to questions testing comprehension of those ideas" (p. 3). They note a difference in definition from that of philosophers of science, and claim to be
concerned with "pedagogical" explanation as discussed by "Swift (1961), Thyne (1963, pp. 126-55), Meux and Smith (1964 pp. 146-148), Nuthall and Lawrence (1965, pp. 33-48), and Bellack and his associates (1966, pp. 24-25)" (p. 3).

The study sample consisted of fifty-eight experienced social studies teachers (volunteer), teaching their own twelfth grade San Francisco Bay public school classes. The pupils were grouped heterogenously by general ability. The analysis dealt with only forty-three of the original fifty-eight teachers, however.

Belgard et al. concerned themselves with the following:

...first with the reliability and generality of effectiveness in explaining over lessons; second, with the reliability and generality of pupils' mean ratings and attention reports over lessons; and third, with the correlations of effectiveness in explaining with class ratings of teacher competence and with measures of pupil attention. (p. 9)

Teachers presented two lectures of fifteen minutes duration on successive days (one each day) on identical content. The lecture material came from two Atlantic Monthly articles, one on Yugoslavia (lesson one) and the other (lesson two) on Thailand. The teachers were instructed to
explain the important ideas and principles, along with the stipulation that they were not to incorporate content not included in the specific articles. In addition, restriction on method to be employed limited teachers to lecture and use of the chalkboard only, and forced them to refrain from such commonplace tactics as questioning, class discussion, and monitored student note-taking.

On the third day of the study, all classes were presented a fifteen minute audiotaped lecture on another Atlantic article, this one dealing with Israel.

Upon completion of each lecture, students were given a ten-item comprehension test over the lecture; an Attention Report, soliciting student self-reports on their attention level throughout the lecture; and a modified version of the Stanford Teacher Competency Appraisal Guide (STAG), dealing with the following nine dimensions: (1) clarity of aims, (2) organization of the lecture, (3) beginning the lecture, (4) clarity of presentation, (5) pacing the lecture, (6) pupil attention, (7) ending the lecture, (8) teacher-pupil rapport, and (9) amount of learning.
Each of the dimensions was rated by the student on a seven-point scale from "truly exceptional" to "weak", with an additional category, "unable to observe". Further, the Belgard et al. study can be grouped with the Fortune et al. (1966) and Fortune (1967) studies reviewed below because all three relied on STAG ratings for the clarity measure.

The measures taken on the two teacher-delivered lectures (Yugoslavia and Thailand) were adjusted using the scores and ratings on the Israel (no teacher) lesson both for difference in class aptitude and student tendencies to rate teachers favorably or unfavorably. Reliability and stability of a teacher's ability to explain was determined by the comparison of these adjusted mean achievement scores.

The reliability and stability of pupil ratings fell out of the comparison of class mean ratings of teachers on the STAG. Finally, student STAG ratings were correlated item by item with adjusted mean achievement to determine which rating items carried the most weight with respect to achievement.
The results showed consistent "positive" and "substantial" correlations between achievement and student ratings on the STAG, especially with respect to "clarity of presentation" and "clarity of aims". These two, along with "amount of learning" (what students thought or estimated they had learned) had the highest correlation to achievement scores.

This study obviously taps a high-inference measure of student perceived teacher clarity (over two of the items) and is correctly viewed as a contributor to the clarity/achievement link. Heath and Nielson (1974) agree that the STAG items have face validity with 'clarity'; but where both Rosenshine and Furst (1971) and Rosenshine (1971) claim significant results, Heath and Nielson find no evidence of the original authors making such a claim. It is only when one examines the table of results that one can find correlation coefficients between clarity items and achievement large enough to warrant statistical significance, and it is those correlation coefficients that Rosenshine cites in his Table 3.4 (p. 104).

One must approach with caution the claiming of significant results by reviewers when the original
authors do not make such a claim. Since Rosenshine was one of the original authors, one might assume the possibility of his having information at his disposal that could warrant the claim of significant results, but one is left uncertain.

One additional point ought to be made about this study in that the methodological restriction placed on teachers (only using lecture and chalkboard) might distort our understanding of 'teacher clarity'. Other behaviors naturally performed by teachers in conjunction with lecturing and using the chalkboard might complement the lecture, producing greater clarity throughout. By eliminating such behaviors, comparisons between this study and others that follow are complicated; and questions of ecological validity of the study might justifiably be raised.

Fortune, Gage, and Shutes (1966)

Fortune et al. were also interested in studying teacher explanations, claiming that while "the ability to explain is a central aspect of teaching, ...in the research on teaching only one study has been found which is directly concerned with isolating this ability" (p. 2).
According to Fortune et al., Rudin (1961) reported a study that supposedly tested teachers' ability to explain and found differences in "lecture effectiveness" between teachers significant at the .01 level, but his study did not show generalizability over different pupils and/or subjects.

The purpose of the Fortune et al. study is to test whether Rudin's technique, or an adaptation of it, can identify differences in teachers' abilities to explain that will be reliable over topics, pupils, and both at once. If such a technique can be applied successfully, we may infer generality in this ability and place teachers along a continuum of effectiveness in explanation. Then we can analyze their verbal and non-verbal behavior in the explaining situation to determine behavioral correlates of effectiveness in explaining. (p. 3)

Each teacher (social studies interns, $N=30$) taught a total of four separate fifteen minute lessons on three separate topics to two groups of students (grades ranging from eight to eleven). The students were in eight groups of five, randomly sampled from a pool of forty hired for this project. All forty students were taught by each intern group, but no pupil was taught the same lesson twice.
Students were tested with ten-item multiple choice instruments prepared by the researchers and checked for content validity. Micro-class mean scores served as the index of effectiveness for each intern. In addition, pupils rated the intern with the STAG, as in the Belgard et al. study. The instrument has thirteen items, but the primary concern here is on the two "clarity" items prominent in the Belgard et al. study.

While research questions focused on issues of generalizability of explaining ability over groups and over topics, as well as on items on the STAG that seem to relate to effective explanation, it is the latter that is of interest here. The STAG item receiving the highest correlation with both regression and block adjusted totals is "Clarity of Presentation" (.39 and .56, respectively). Because performance on tested material that was withheld from interns in advance "predicted student response to their teaching better than did their performance on the 'given' items" (p. 12), the item dealing with how the lesson is begun by the intern was hypothesized to be related to skill in explaining, too.
In Table 3.4, Rosenshine (1971) cites a significant finding for "clarity of presentation" at the .05 level \( r = .39^* \), and in the text referred to Fortune et al. as one of three studies with clearly significant results (p. 103). A similar claim is made by Rosenshine and Furst (1971), with the added statement that the "organization of the lesson" might relate to overall clarity, due to common factor loadings of "clarity of the lesson", "coherence of the lesson", and "organization of the lesson" in the Solomon, Bezdek, and Rosenberg (1963) study reviewed later in this piece. Yet no significance claims were made by Fortune et al. for either item on the STAG.

Heath and Nielson (1974) see face validity between "clarity" and the "clarity of presentation" item on the STAG, as well as between "clarity: organization" and "organization of the lesson", but the latter category was not mentioned in the results section of the Fortune et al. piece as being of interest. In fact, in examining Table 8, item three (organization of the lesson) had lower correlations with achievement than eight other items over both regressed and block corrected scores (and eleven if one only looks at block
corrected). Heath and Nielson rightly state that no significance claim was made, as well. It is also questionable that the STAG items covariate independently, as is pointed out by Heath and Nielson.

**Fortune (1967)**

Fortune (1967), the third of the STAG studies, was concerned with identifying and assessing teacher skills in presenting content to fourth, fifth, and sixth grades, that would result in student performance differences on criterion-referenced tests. He was also interested in whether and how these skills generalized over age level, content, and a combination of the two.

The sample consisted of forty-two teachers (fifteen fourth grade, fourteen fifth grade, and thirteen sixth grade) who were inexperienced junior and seniors currently enrolled in a school of education. The pupils numbered 256 and were students in a campus laboratory school, grades four, five, and six. Generality over grade level could thus be determined, and to assess content generality, specially designed lessons in English, mathematics, and social studies were taught.
Teachers were rated by observers using a modified version of the STAG instrument, with the item of interest here being what Fortune called "lesson presentation". These ratings were then correlated with student achievement on the lesson posttests.

While Fortune found the items on the STAG instrument producing similar correlations, "Item 5 on lesson presentation did produce generally higher correlations" (p. 28). No significance levels were mentioned. Rosenshine (1971) sees this study as being similar to the Belgard et al. and Fortune et al. studies due to the use of the STAG, especially with respect to items "clarity of presentation" and "clarity of aims". There is an additional reference to "organization of lesson". In Table 3.4 (p. 104) Rosenshine lists "clarity of lesson" as being correlated significantly with achievement (mdn. r=.71*). Rosenshine and Furst (1971) make similar claims, and link "organization" to "clarity" via Solomon et al. as above.

There are problems with all of this because first, Fortune never made significance claims; and second, Fortune speaks of "lesson presentation" and not "clarity of lesson" or "aims". Heath and
Nielsen (1974) agree, finding no face validity between "clarity" and "lesson presentation" and "organization of the lesson"; they also find no significance claims.

If Fortune intended "lesson presentation" to be equivalent with the clarity items discussed above in the STAG, it is not stated specifically in the study. In addition, since we do not know how Fortune modified the STAG, we cannot be sure of items or of operational definitions of individual items. This, combined with the above absence of claims of significance (made explicitly or implicitly), sheds some doubt on this study's support for "clarity" as a variable correlating highly with increased student achievement.

Solomon, Bezdek, and Rosenberg (1963)

The Solomon et al. study was a part of a research program focusing on specifying the "concomitants and determinants of effective teaching for adults" (p. 2). The sample consisted of twenty-four teachers of adult evening classes in introductory American government in thirteen colleges and universities over one semester. Teachers were observed twice by pairs of trained
observers (a different pair for each lesson observed) during the middle of the semester. These sessions were also audiotaped.

Class mean raw gain scores on factual and comprehension measures from pretest and posttest performance served as the measure of effectiveness. The test consisted of thirty-five items testing factual knowledge of American government and ten items that assessed the student's ability to comprehend a "difficult" passage independent of material covered in the lessons. Since there was a high correlation between raw and residual gain scores, the authors claimed justification for using raw gain scores only.

The following three sources yielded 169 teacher variables: (1) an observer rating scale over teacher performance during the observed sessions; (2) audiotaped analysis providing frequency counts of behaviors deemed important from the observed sessions; and (3) a student questionnaire made up of fifty-two descriptive and eight evaluative items administered at the end of the term. A given behavioral item was almost never repeated across assessment instruments.
A factor analysis of the measures obtained yielded eight bi-polar factors, which were then correlated with achievement. The factor of interest here was labeled "Obscurity, Vagueness, versus Clarity, Expressiveness"; it correlated significantly with student achievement in terms of factual gain, but not comprehension. It was the common factor loading of variables relating to organization, coherence, and clarity that led Rosenshine and Furst (1971) to suggest that "the variable organization may be similar to clarity" (p. 44).

Heath and Nielson (1974) see face validity between 'clarity' and the factor above, and they say that significance claims are justified. But, the small sample size (n=24) as compared to the large number of variables used in the factor analysis (p=169) severely violates the ratio of sample size to variables needed for stable factor analytic results. The investigators themselves recognized this, stating that the above "increased the possibility that the results are idiosyncratic and unreplicable" (p. 23). Hines (1981) and Cruickshank and Kennedy (1985) make a similar charge, as well.
An additional unfortunate design characteristic, again noted by Hines (1981) and by Cruickshank and Kennedy (1985), is that no behavior of interest was rated by both observers and students, thereby preventing the possibility of comparing different source measures of the same behavior to get at the question of validity of the measures of said behaviors. Given the above problems, the results of this study must be handled cautiously.

Wallen (1966)

The problems Wallen studied are many, including the relationship of teacher behaviors to student classroom behaviors and achievement. The sample of teachers was drawn from the Salt Lake City School District using the following criteria: (1) schools were stratified by socioeconomic status; (2) several teachers were chosen from the same school for ease of transportation for the observers; and (3) no first year teacher was used.

The actual selection was made by the elementary supervisor, who looked for schools that were willing to cooperate, that did not have teachers already participating in a study, and that
had principals sympathetic to the need for research. The author claims that the final sample does not deviate appreciably from a stratified random sample, however. The final sample consisted of thirty-six teachers in grade one and forty in grade three, all of whom are female.

Students were assessed with pretests and posttests on a number of measures. The most relevant here are standardized tests of reading and arithmetic achievement (CAT), tests of creativity, and affective/social measures regarding liking school and quality of pupil-to-pupil relationships.

Measures taken on teachers centered on observation of classroom behavior, ratings by observers, and a global Q-sort that yielded raters' overall impression of individual teaching performance. Only one item in the Q-sort need concern us here - that dealing with teachers described as "intellectually effective". The author defined this notion as follows:

The intellectually effective teacher (1) was the one who appeared to be able to explain concepts clearly and such that the student seemed to be gaining understanding. She had facility with her material and enough background to answer intelligently her children's many questions. The teacher rated low (7) impressed the observer less in these respects. (p. 218)
The results indicate that a significant association obtained between "intellectual effectiveness" and student outcome measures, including CAT scores (first and third grades), creativity in terms of divergent thinking (third grade only), and assorted affective measures of importance to the researcher (first and third grades).

Rosenshine (1971) states that "intellectual effectiveness" seems related to clarity, but that it is impossible to determine whether the two are identical concepts. Given this caveat, he lists this study (actually, he counts this as two separate studies - first and third grade) with that of Chall and Feldmann (1966) and Morsch et al. (1955) as only marginally related to clarity.

Rosenshine and Furst (1971) use "intellectual effectiveness" as one example of "clarity", with none of the concerns of marginality stated above. Further, Heath and Nielson (1974) see as warranted both claims of face validity and of significance. One must conclude that the Wallen study lends support to the clarity/achievement relationship. Yet the nature of the definition of 'intellectual effectiveness'...
effectiveness' seems to beg the achievement question. The intellectually effective teacher is defined as one who brings about student understanding, which is awfully close to what is supposed to be measured by achievement tests.

Chall and Feldmann (1966)

According to Chall and Feldmann, a critical shortcoming of previous research on the teaching of reading was the failure of investigators to account adequately for differences in teacher implementation of the various methods studied. The investigators thought that a teacher might modify a teaching method due to differential perception of the components of the espoused method, thereby affecting student achievement.

For example, in the eclectic, basil reader approach used by many teachers, it was believed that although this approach had a meaning emphasis, some teachers might "pull" it more in the direction of "decoding" or "meaning", and that such differences in implementation might possibly affect different components of pupils' reading achievement. (Chall and Feldmann, p. 2)

A second potential modification might arise due to a teacher's perception of the student's pre-reading skills, thereby altering implementation in terms of
adjusting to expectations of skill levels.

The key question was "Does the teacher make a difference in the reading achievement of her pupils?" (Chall and Feldmann, p. 3). If she does, what is it in her behavior that might account for the difference? The researchers looked at

...the relationships among the "approved" reading program, i.e., what the teachers said they emphasized, and what they actually emphasized as observed during reading lessons, all in relationship to first grade reading achievement. ...

Stated more precisely, the interrelations of three areas were to be investigated: (1) The child's level of pre-reading skills; (2) The reading method said to be used in class; (3) The teacher's implementation of the method; all three areas were to relate to reading achievement at the end of the first grade year. (Chall and Feldmann, p. 3)

The study was done descriptively, in a naturalistic setting, the task being observing and recording the ways teachers (in one system with "disadvantaged" children) interpreted and implemented an eclectic basal reading program and the effects of implementation on student achievement.

The sample was a select group of twelve teachers and their first grade classrooms in the New York City schools. The selection was based on
willingness to participate (on the part of the teachers and their principals) and the use of an eclectic basal reader approach. Further, experience and sound-symbol/meaning orientation were factors in choice. Four classrooms were observed weekly and the other eight monthly.

Teachers were rated on professed instructional method on a continuum of meaning-oriented to phonic approaches. A classroom observation inventory was constructed to measure teacher behaviors regarding (1) reported emphasis (meaning or phonic) and (2) the investigator's perception of a "good teacher" (defined as having a positive effect on student reading achievement). The variables included overall competence, amount of individual attention given, appropriateness of lesson in terms of difficulty, ways used to obtain student involvement, handling of student errors, interest level of materials, and classroom structure. An interview was also used to determine more fully teacher attitudes and practice.

Students were tested twice (October and June) using a battery of reading instruments. The four classrooms observed weekly were tested a third time (January).
The results of analysis showed that teachers

...who were judged most competent, those who used a predominantly thinking approach to learning, those who emphasized a sound-symbol approach within an eclectic reading method, and those who gave lessons of appropriate level of difficulty, had a positive association with June reading achievement scores. (Chall and Feldmann, p. 79)

Further, the teaching excellence factor (Factor 1) accounted for the greatest amount of variance in terms of achievement scores. The key variable seemed to be overall competence, but also with a high loading on this factor were ability to teach reading, ability to organize the groups and classroom procedures (high structure), and sensitivity to children. High amounts of pupil involvement also characterized the competent teacher.

Of particular interest here is the "organization" variable (high class structuring), represented by the teacher who "tended to give the pupils clear directions and expectations were clearly spelled out in detail (variable 18)" (Chall and Feldmann, p. 110). Also connected with organizational ability was high pupil participation, in part related to teachers whose "expectations are clear" (p. 46).
Rosenshine (1971) and Rosenshine and Furst (1971) claimed that the observation scales seemed related to clarity, but as was the case with Wallen (1966), it was impossible to determine whether they measured clarity in the same way as other studies discussed (Rosenshine, p. 101). The significance achieved for lesson difficulty being "just right most of the time", coupled with Wright and Nuthall's (1970) finding (below) that questions answerable the first time as a parallel to the difficulty notion seems to tie in well with "clarity" and "intellectual effectiveness", according to Rosenshine (1971).

Heath and Nielson reject this study out of hand; they claim there is no face validity between 'level of difficulty' and 'clarity'. Further, there is no claim of significance made for "lesson difficulty". The question of validity will be addressed in the analysis that follows this research review. A more important question now is whether there are other elements in the Chall and Feldmann study that relate to clarity. As was mentioned above, the "class structure", "organization", and "pupil participation" variables seemed to include components that come close to
'clarity' and are spelled out in detail in Appendix C, page 9, of Chall and Feldmann. As it stands, however, a direct connection to clarity is difficult to make.

Morsch, Burgess, and Smith (1955)

Rosenshine (1971) lists Wallen (1966) and Chall and Feldmann (1966) in the category of marginality along with a third study, that of Morsch et al. With respect to the Morsch et al. study, Rosenshine (1971) lists the instructor's "understanding of students" as significantly correlated with achievement, and non-significant but positive results for instructor's "knowledge of subject" (Table 3.4, p. 105). This reference to Morsch et al. is omitted from the Rosenshine and Furst (1971) review, however. Heath and Nielson discuss a Morsch (1956) article from the perspective of "criticism", but no mention of "clarity" is made. (Rosenshine and Furst (1971) list the same Morsch study in their "criticism" category, also.)

Since the original 1955 study was unavailable, little more can be said other than, on the surface, instructor's knowledge of students might relate to
clarity; but the support given the clarity/achievement link by the Morsch et al. (1955) study is at best minimal and probably should be disregarded, especially since Rosenshine and Furst omitted it from their review.

Wright and Nuthall (1970)

This study is "an attempt to identify the short-term effects of teacher behaviors in a set of three subject-matter controlled lessons of the discussion or recitation type common in most elementary school classrooms" (Wright and Nuthall, p. 477). The intent was to identify the most promising and significant relationships between selected teacher behaviors and student achievement.

Seventeen teachers (selected to gain a spread in years of teaching experience) each taught approximately twenty students chosen from regular Standard Two classes (approximately equal to third grade in the U.S.). The lessons and the testing instruments were standardized and tested in an earlier pilot study.

Pupils were measured over intelligence, general knowledge in elementary science (since that was the content of the test lesson), and an
achievement test criterion referenced to the lesson presented.

The teacher behavior variables studied were chosen in two stages. The first, the observational pilot studies mentioned above, generated sixty-two variables that showed promise. The second stage eliminated behaviors that occurred infrequently or were not randomly distributed among teachers. Several were combined into composites when correlation was high between original variables and when they seemed similar enough in the eyes of the researchers. The result was a list of twenty-eight variables, separated into five categories.

- **Teacher 'structuring'** refers to the teacher supplying information either before or after a question-answer sequence. Teacher 'solicitation' refers to verbal moves which are intended to elicit a verbal or physical response from a pupil. Within this category 'reciprocation' refers to the teacher asking the pupil who made the previous response to extend or lift (to a higher thought level) what he has just said.

- **Teacher 'reaction to pupil response'** includes the kinds of comments that teachers make to a pupil response which are not in the form of a further solicitation. (Wright and Nuthall, p. 481)

Since pretesting was deemed inappropriate, multiple regression analysis was used to get a "predicted" test score, and a residual score
(actual minus predicted) was used as a measure of teacher effects (corrected for intelligence and prior knowledge). Class average residual scores served as the reflection of teacher effects.

Analysis of variance was performed on the regression analysis to determine the amount of total variance due to non-teacher effects versus teacher effects, with results showing about 14% of the variance attributed to class differences.

Intercorrelations among the twenty-eight variables were computed and those showing reliable relationships (p<.10) with achievement were examined closely. This analysis yielded an additional set of variables which "should not be treated as additional significant findings, but rather as additional information about the findings" (Wright and Nuthall, p. 486). They include "patterns of solicitation", which seems to hang on the ability to ask a question once, without having to restate or rephrase it to get an appropriate student response.
The authors group this study in with others, stating:

The studies reported by Rosenshine (1968b), like this study, suggest a strong relationship between pupil learning and a certain degree of linguistic precision and clarity (lack of vagueness, careful structuring) on the part of teachers. (pp. 489-490)

It appears that, while ‘clarity’ is never mentioned until the last paragraph of the article, it is implicitly a part of the study and explicitly discussed as being a useful construct for theoretical and experimental study.

Rosenshine (1971), while not making this study a part of his table of clarity studies, does state that

...additional low-inference components of clarity or intellectual effectiveness are contained in the study by Wright and Nuthall (1970). They found that teacher 'utterances' containing one question were significantly related to achievement (r=.54), whereas utterances with two or more questions or teacher information following a question were each negatively related to achievement (r=-.43* and -.52*). ...The effective and ineffective patterns identified by Wright and Nuthall (1970) appear to be similar to 'appropriateness of the lesson' as measured by Chall and Feldmann (1966) and might also be indicators of intellectual effectiveness and clarity. (p. 107)

But there is no evidence that Wright and Nuthall mean anything like "level of difficulty" of Chall

Rosenshine and Furst (1971) mention Wright and Nuthall (1970) again regarding single versus multiple questions as a low-inference indicator of clarity. Heath and Nielson (1974) do not see face validity between low-inference 'clarity' and "% of questions leading to pupil response" (p. 465, Table 1), nor do they see a claim of significance on the part of the original authors, contrary to Rosenshine's (1971) assertion.


This study evolved out of the work done by Gage, Belgard, Dell, Hiller, Rosenshine, and Unruh (1968) on specifying teacher behaviors which "contribute to or interfere with effective explanation in the ordinary classroom" (Hiller et al., p. 661). The "primary interest" of this study is the "discovery of important correlates of explanatory lecturing" (Hiller et al., p. 662), as they relate to student achievement.

Experienced teachers of twelfth grade social studies from the San Francisco Bay area volunteered to be videotaped in their own classrooms. Students were grouped heterogenously and numbered between
ten and thirty-one per group. The teachers gave
two fifteen minute lectures on successive days and
pupils were assessed on ten-item criterion
referenced multiple choice tests developed in the
Fortune et al. (1966) study. The class mean score,
corrected for class ability and interest and
presentation of relevant material in the lecture,
served as the measure of effectiveness.

"Thirty-five categories hypothesized to
represent important attributes of explanatory
lectures were selected before the data were
studied", and they were "consolidated into a set of
five factors ...based on the authors' intuitive
judgments alone" (Hiller et al., p. 663), not as a
result of factor analysis. The five
categories/factors are: verbal fluency, optimal
information amount, knowledge structure cues,
interest, and vagueness.

The results indicate a correlation for "verbal
fluency" of .42 (significant at the .01 level) and
for "vagueness" of -.59 (significant at the .001
level). Hiller et al. pay primary attention to the
"vagueness" factor in the discussion, as it was the
strongest indicator. 'Vagueness' was defined as
"the state of mind of a performer who does not
sufficiently command the facts or the understanding required for the maximally effective communicator" (Hiller et al., p. 670).

Hiller et al. claim that vagueness is an "internal stimulus condition; the frequency of vagueness responses reveals the strength of this stimulus condition. Vagueness arises as a speaker commits himself to deliver information he can't remember or never really knew" (p. 670). Fluency may also be a cause or a correlate, as measured by sentence length minus distracting interruptions.

The Hiller et al. study was not mentioned by Rosenshine (1971), and only mentioned in passing in Rosenshine and Furst (1971) as a study "emphasizing low-inference behaviors which comprise clarity" (p. 44), in this case the use of fewer vagueness terms correlating with effectiveness. Heath and Nielson (1974) accept "vagueness categories" of Hiller et al. as having face validity as a low-inference indicator of clarity, with significance levels correctly reported.

It is difficult to tell how important the Hiller et al. study is for the Rosenshine and Furst (1971) claims regarding clarity, however, since it is not mentioned as one of the seven major studies
supporting the clarity/achievement link. But one could easily include it among the group of supporting studies.

What is needed is further explication of the clarity/vagueness relationship, a point of interest in Chapter VII of the present study. In addition, the Hiller et al. study occupies a position of prominence as it is viewed historically as the seminal study leading to the next line of inquiry, low-inference inhibitors of teacher clarity.

In sum, we find that, of the original studies noted in Rosenshine (1971) and in Rosenshine and Furst (1971), only three seemed to intend a study of clarity (Belgard et al., Fortune et al., and Solomon et al.). In two of those studies (Belgard et al. and Fortune et al.) the authors did not claim significance. A more complete, tabular summary of the studies, the variables studied, and probable connections made by the reviewers is presented in Cruickshank and Kennedy (Table 2, 1985). What is apparent here is that the original support claimed for clarity as a primary variable associated with increased student achievement is not as clear-cut as previously assumed. The support is examined anew in Chapter VIII of the
present study. Further, "there is no commonly agreed-upon definition of teacher clarity" and, to this point in the review of research, "there has been no real targeted study of it" (Cruickshank and Kennedy, 1985, pp. 18-19).

Inhibitors to Teacher Clarity

The studies in this section flow primarily out of the Hiller et al. (1969) work on vagueness terms discussed above. The interest throughout this program of inquiry is to isolate the teacher verbal behaviors that act as inhibitors to clear presentations. While vagueness is one such inhibitor, there are others. It is the existence of these other inhibitors that makes the labeling of these studies as the "vagueness" studies inaccurate. In addition to isolating the inhibitors to clarity, the effects of those inhibitors on student achievement and assessment of teaching are examined in both correlational and experimental designs.
The purpose of this paper is to analyze the verbal behavior of a person who needs to articulate a position while struggling with problems such as a lapse in memory, momentary confusion, or a lack of adequate information. The "key term" for Hiller in this analysis is 'vagueness', defined as follows:

"Vagueness is a psychological construct which refers to the 'state of mind' of a communicator who does not sufficiently command the facts, knowledge, or understanding required for effective communication," (Hiller, 1968). Vagueness is an internal stimulus condition principally determined by a performer's instant command of knowledge, by his motivation to communicate and by his own evaluation of imperfect success. (Hiller, p. 151)

Because vagueness is not measured directly, but rather is inferred from the speaker's verbal behavior, three parameters must be taken into account when comparisons across speakers is attempted: (1) the "factual load" and "logical complexity" of the content, (2) the "intended audience", and (3) the "communicator's task orientation and motivation" (pp. 151-52). All response items used to measure vagueness in this study come from the work of Hiller et al. (1969).
Vagueness as a construct incorporates the following assumptions:

1. The conceptual vagueness experienced by a communicator as he gropes to achieve an idea or to locate a word or phrase delimits a stimulus condition, Vagueness (V), and as such comes to have an associated verbal vagueness response (VVR) hierarchy based upon the individual's reinforcement history.

2. The experienced speaker may recognize limitations in his knowledge and therefore anticipate the potential development of V while performing; VVRs may be linked to this anticipation as well as to V itself. Although differences among VVRs corresponding to differences in V are discernable and could eventually be studied, all VVRs have been assumed equally valid and reliable.

3. Each language community develops a set of commonly used VVRs; subcultures may also develop their own VVR sets and hierarchical arrangements.

4. VVRs may serve a listener or reader as clues to the vagueness of a communicator. Furthermore, a competent performer who has VVRs placed high in his verbal hierarchy may falsely create an impression of being vague. Speakers may also intentionally employ certain of the VVRs to equivocate; politicians, for example, may be excessive VVR users. (Hiller, 1971, pp. 152-153)

In reviewing two earlier studies (one dealing with student use of VVRs in written essays and the other Hiller et al., 1969) Hiller inferred that vagueness as a state of mind of the speaker leads to the use of VVRs. This inference is tested in
the 1971 study, with vagueness as that stimulus condition "which directly varies with a speaker's lack of knowledge" (p. 153). By manipulating the speaker's command of knowledge, one should be able to manipulate the use of VVRs, according to the above assumption.

Two treatment conditions were employed to manipulate relevant knowledge. First, one group of speakers got an intact, good lesson upon which to base a future lecture. The second group got a lesson with 50% of the original material replaced at random with material from a second lesson. Second, "immediate command of knowledge was manipulated by providing one group of speakers with more time to prepare their lectures than a second group" (p. 154). The result is a 2x2 factorial design crossing knowledge and preparation time.

Twenty-four male volunteers drawn from college psychology courses were randomly assigned to groups. The "class" receiving the lecture varied from one to three persons (mode 1, mean 1.5) with sex left to chance. The lessons were transcripts of the two "most successful teachers of the Gage et al. (1968) studies" (p. 154). From these fifteen minute lectures, the experimenter took four main
topics along with five to ten key words or phrases for each and presented this information via audio tape to the subjects, who were then to prepare a two minute lecture on each of the four topics. The low knowledge group heard tapes that replaced 50% of the relevant material with extraneous material.

To establish a VVR baseline, all subjects gave a talk independent of treatment. Posttests from the Gage et al. (1968) study were used to see whether the teachers understood the fifteen minute tapes.

Subjects were told they would have one minute to prepare a talk after having been shown the topic, but that particular topic might or might not be the one on which their talk would be based. The high preparation group always got the right topic; the low preparation group always got the wrong topic. The lows only had enough time (fifteen seconds) to read a topic before having to give the lecture.

The results of the subject comprehension test revealed significant differences (p<.005) in the appropriate direction in each of the lessons, and combined scores also indicated a significant (p<.05) difference. The ANOVA main affect for
knowledge (with one outlier score removed due to a significant Dixon outlier statistic) showed significance at the .005 level. The preparation main effect was not significant.

The results were mixed, with problems on the time of preparation phase and anxiety level of those hearing the mixed (low knowledge) tapes discussed as extraneous complicating factors. The author did argue for the added stress factor as having ecological validity. Stress normally accompanies poor preparation. It is likely, claims Hiller, that some W R s are stress related, others knowledge related, and still others related to style.

Smith (1977)

The purpose of this study was to identify verbal behaviors of teachers of mathematics as they relate to pupil achievement. Twenty teachers with at least one year of public school teaching experience were drawn randomly to teach a twenty minute lesson on a first year algebra topic to one of their regularly scheduled algebra classes. The teachers all used the same text, and students (n=455) had no previous exposure in class to the
Objectives for the lesson and sample problems were given to the teachers to aid in their preparation. The lessons were tape-recorded and students were assessed on a fourteen item criterion referenced posttest not previously seen by the teachers.

Mean class posttest scores were analyzed, both from the perspective of raw class mean results and adjusted class mean scores (based on CAT percentile scores via analysis of covariance). Both sets of scores served as criteria.

Nine independent variables were studied. Total lesson time and percentage of teacher talk were quantified from the tapes. The tapes were then transcribed and rated over the seven remaining variables: vagueness terms (Hiller et al., 1969), teacher responses of "OK" (Hiller et al., 1969), mazes (false starts, halts in speech, redundently repeated words, or tangles of words), teacher-initiated student responses, pupil-initiated responses, lesson objectives (number covered and logical sequence), and examples and applications (number and relevance).
Three variables achieved significance (p<.05) for positive correlations: "points awarded for lesson objectives, the percentage of relevant examples per lesson, and the average number of "OKs" per minute of teacher talk" (Hiller, p. 200). Two variables, irrelevant examples and vagueness terms, were negatively correlated with achievement (p<.10); but the authors noted problems with rater reliability on these measures. The reliability problems seem related to high frequency and variety of specific instances of each category.

Since the three variables positively correlated with achievement also correlated positively (p<.10) with one another, Smith suggests that a more global variable involving organization, structuring, and clarity of lessons might be at work. The use of "OK" was context-specific and often seemed to help students see when a thought was beginning or ending, thereby enhancing clarity. The use of "OK" appears on the Ohio State instrument as an indicator of a low-inference clarity behavior, discussed below.
Smith and Edmonds

The studies preceding this one investigated the relationship between vagueness and student achievement in a descriptive, correlational sense. This study "was designed to investigate the joint effects of different degrees of teacher vagueness and student participation on the learning of mathematical concepts" (Smith and Edmonds, p. 228), using an experimental design.

204 college students were randomly assigned to one of six (n=34) groups crossing three vagueness conditions (none, moderate, and high) with two student activity conditions (passive learning and active learning). Each group was shown a twenty minute videotape of the mathematics lesson, which varied only over the variables above. Following the lesson, students were assessed on a twenty-item criterion referenced test.

Two lessons had high vagueness, two medium, and two no vagueness terms (as used in the Hiller et al. study). Lessons differed over activity level in that active students had time to work sample problems individually during the lesson, followed by additional videotaped instruction covering the correct solutions. The passive
condition substituted detailed analysis of each problem for the individual problem solving sessions.

A 2x3 ANOVA on achievement scores showed no main effect for participation and no vagueness/participation interaction. The vagueness main effect was significant (p<.05), with a Tukey follow-up revealing significance between no vagueness and high vagueness. This supports Hiller et al. and Smith (1977) with respect to the effect of vagueness terms on achievement, but this time employing an experimental design controlling for other extraneous variables such as organization, content covered, and use of examples. Smith and Edmonds conclude that "it may be that a high frequency of teacher vagueness terms causes pupils to perceive the teacher as being disorganized regardless of the content and the examples the teacher presents" (p. 232).

Land and Smith (1977a)

This study extends the effort at experimental rather than descriptive inquiry into the connection between teacher clarity and student achievement. The variables (low rather than high inference)
employed come out of the Hiller et al. work, and a special note is made with respect to the Smith and Edmonds piece being the only study to date using an experimental design. The historical roots of the study presented, the authors state that "the present study focused on a low inference behavior or indicator of teacher clarity, teacher vagueness" (p. 196).

Fifty college students randomly assigned to one of two groups (high versus low teacher clarity) were shown a videotape over the same content (number theory), the only difference being the the presence or absence of vagueness terms (the basis of clarity in this study). A fourteen item criterion referenced posttest (at Bloom's comprehension and application levels) followed the tape. No pretest was deemed necessary, due to the random assignment of subjects to groups.

Students in the "clear" group (no vagueness terms) significantly outscored the "unclear" group (p<.05). This was seen as verification of the Smith and Edmonds findings. There was a "cause-effect relationship between teacher vagueness (unclear versus clear teaching) and student learning" (Land and Smith, 1979a, p. 197).
It is perhaps this apparent equating of "vagueness" with "lack of clarity" and "no vagueness" with "clarity" that has led to the mistaken terminology discussed earlier in this review. It will become obvious below that this simple clarity/vagueness dualism is inaccurate and misleading.

Since Hiller (1971) reported a decline in vagueness terms with increased subject matter knowledge, the authors suggest that teacher vagueness might be reduced by increasing teachers' knowledge of subject matter and/or to train teachers directly to reduce vagueness. It is proposed that both could lead to higher student achievement.

Land and Smith (1979b)

Summarizing the above studies with respect to vagueness and resultant student achievement, the authors attempt to refine the study of inhibitors to clarity by looking at the effect of three low-inference variables of teacher clarity - vagueness terms, mazes, and additional unexplained content - on student achievement. Vagueness terms were defined as "words or phrases indicating approximation, ambiguity, or lack of assurance."
The support for a negative effect of 'vagueness' as defined above was already documented.

Land and Smith attempted to look more closely at mazes, since they had negative but nonsignificant effects in the Smith (1977) study. Using the clarity work done at Ohio State (discussed in the next section) and a study by Linville (1970), it appeared that "unexplained content" also showed promise.

A 2x2x2 factorial design crossed the three variables to study "joint effects of low inference clarity indicators" (Land and Smith, 1979b, p. 55). For control, lessons were scripted and videotaped by one teacher, the only difference being the presence or absence of the low-inference indicators.

Subjects (college students, n=160) were randomly assigned to treatment groups and were tested on a seventeen item criterion referenced instrument. The resulting ANOVA revealed a significant main effect for mazes (p<.02), with higher achievement in the "no maze" group. The main effect for vagueness was in the appropriate direction, but was insignificant (p<.07). The main
effect for "unexplained content" and all interactions were insignificant.

The authors claimed a cause/effect relationship between vagueness terms and mazes and student achievement (despite the vagueness terms effect falling short of significance). Yet they saw the absolute effect as small. Since students may have had some prior knowledge of content, the additional content may have aided learning, as three of four groups with additional content scored higher than those without.

The correlational studies lend support to generalizing vagueness/maze findings to longer-term teaching/learning situations, claim the authors. They suggest that teacher trainees should learn to be less vague and use fewer mazes.

**Smith and Land (1980)**

In a paper related to the preceding one, the authors focus on student evaluation of instruction. The main question is: Can student ratings be validated against low-inference clarity behaviors? Further, what is the relationship between teacher clarity as perceived by students and student achievement?
The design and instrumentation of this study are identical to the preceding one, with the addition of a thirteen item rating form on the lesson presentation. A 2x2x2 ANOVA was run on each of fifteen dependent variables (scores on the thirteen item rating scale, combined lesson evaluation form, and the posttest on achievement). The achievement results are reported above.

No mazes led to better responses on all thirteen items on the evaluation form (p<.001), as well as on the overall total. No vagueness significantly outscored vagueness on items 1,3,5,6,7,11, and 12, as well as on the total (p<.05). All others except numbers 4 and 13 led to better responses but fell short of significance.

Vagueness interacted significantly with mazes on all but four items (3,6,12, and 13). Vagueness interacted significantly with additional content on item 6 only. Mazes and additional content showed significant interaction for numbers 1 and 4. Overall student evaluation of instruction was significantly related to student achievement at the .05 level.
The results of this study indicate that student evaluation of instruction can be useful indicators of instructional effectiveness as defined by the presence or absence of low-inference teacher behaviors. Students generally were able to discriminate between lessons that contained vagueness terms and/or mazes and lessons that did not contain such phrases. Further, student evaluations were reasonably accurate predictors of student achievement. (Smith and Land, 1980, p. 145)

Land (1979)

The purpose of this experimental study was to determine the combined effect of a cluster of low-inference variables — teacher vagueness terms, mazes, "uhhs" (related somewhat to mazes), specification of selected content, extra content, and signals of transition — on student achievement. 'Specification' is here "defined as the presence of an explanation of how a concept was an example of the concept definition" (p. 796). 'Clear transition' "was defined as the presence of such transitional terms as 'now' and 'the last item'" (pp. 796-77). The remainder of the variables appear as they were used in the studies discussed above.
The research questions are:

Does teacher clarity affect immediate student achievement? Do students learning under low-clarity conditions forget at the same rate, at a lower rate, or at a greater rate than students learning under high-clarity conditions? (Land, p. 797)

From earlier research, two variables (emphasis on content and clear transitions) had shown facilitative power with respect to student learning. Three others (vagueness terms, mazes, and "uhs") had shown themselves to be inhibitors. Additional unexplained content was hypothesized to be an inhibitor by Land and Smith (1979b).

A 2x2 factorial design crossing high versus low clarity (defined as the presence or absence of the above variables) with immediate versus delayed testing was used. Lessons were scripted to control for content and presence of the variables being studied. It might be added here that defining 'clarity' as the absence of vagueness is a problem. While removing inhibitors to clarity increases the probability of clear teaching, other variables need to be present. This point is addressed in Chapter IV.
College students were randomly assigned to groups and tested on a thirty item criterion referenced test geared to the comprehension level of the cognitive domain. The resulting ANOVA showed a clarity main effect (p<.01) and a time of testing main effect (p<.05), with a non-significant interaction. When delayed versus immediate testing were analyzed separately, high and low clarity groups differed significantly in the immediate testing situation (p<.05) but not in the delayed testing situation (.05<p<.10). Why this was done is puzzling, given the non-significant interaction effect.

Further evidence for the clarity/achievement link is apparent here, with an added bit of information regarding the earlier-mentioned vagueness/clarity dualism. It is apparent here that Land is going beyond the earlier focus on vagueness terms alone as indicators of clarity. What is hypothesized in this study is that vagueness terms lead to student perception of teachers as uncertain, which causes the student to feel uncertain about what is to be learned. Mazes can distract and interfere (as do "uhs"). Additional content leads the student to focus on
extraneous material and confuses the student over the expectations of the teacher. The result of all of this is lower achievement, according to Land (p. 798).

Land (1980)

In a study similar to the one above, Land grouped the six variables related to teacher clarity with the cognitive level of questions asked on the posttest to determine combined effects on student achievement. The reasoning for this connection comes out of the Solomon et al. finding of differential effects for clarity on student achievement for factual versus comprehension level learning. This study attempts to test experimentally the above phenomenon.

High and low clarity were crossed with knowledge and comprehension level questions in a 2x2 design. Lessons were scripted such that the only difference lay in the presence or absence of the six clarity variables.

Subjects (77 preservice teachers) were randomly assigned to treatment groups (clear versus unclear), viewed the twenty minute taped lesson, and then took a twelve item criterion referenced
posttest (half were randomly given knowledge level questions and half comprehension level questions).

A 2x2 ANOVA yielded a significant main effect for clarity (p<.02) and non-significant findings for level of questions and interaction. This study supports earlier efforts at establishing a clarity/achievement link, but it contradicts the Solomon et al. finding of differential effects of clarity due to cognitive level of questions.

Smith, Denham, and Land (1980)

The purpose of this study was to determine the experimental effect three low-inference clarity variables had on student achievement. Forty-one college students were randomly assigned to treatment groups (high versus low clarity) and presented a lesson on genetics, which differed only over the level of clarity, defined by the presence or absence of the three variables under study (mazes, utterances of "uh", and utterances of "OK"). The first two were supported by earlier studies; "OKs" were intuitively connected to inhibiting student achievement. After presentation of the lesson, subjects were tested on a twenty-four item criterion referenced posttest
written at the knowledge, comprehension, and application levels.

The first research question looked at the joint effects of actual and perceived teacher clarity on student achievement. The resulting 2x2 ANOVA crossing actual/perceived clarity with clear/unclear presentation yielded an "actual" clarity main effect on achievement that was insignificant (p>.05), but it was in the expected direction. Similar results were obtained for "perceived" clarity and for interaction.

The second research question asked whether students who perceive a clear lesson as clear achieve more than students who perceive an unclear lesson as unclear. The results indicate an affirmative answer, significant at the .05 level.

The third research question asked whether students who perceive an unclear lesson as clear achieve more than students who perceive a clear lesson as unclear. No significance was obtained here.

Research question four looked to the joint effects of level of achievement and actual clarity on perceived clarity. The clarity main effect was significant at the .01 level, but there was no
interaction effect of note.

The fifth research question asked what items were most effective in distinguishing between clear and unclear lessons. The greatest mean difference came for the item "well organized versus not well organized".

The sixth and final question dealt with whether there is a difference between high and low clarity lessons on achievement at the knowledge, comprehension, and application levels. Achievement was higher, but no significance levels were given.

A number of reasons for the equivocal results are possible, but the one that the authors focus on is the use of "OKs" as an expected inhibitor. Smith (1977) claimed positive effects for "OKs", at least in some contexts. This expectation is born out in the Ohio State studies reviewed below. Smith et al. (1980) adds support for the student's ability to perceive clarity accurately.

*Smith and Bramblett (1981)*

The effects of clarity on achievement in social studies (Hiller et al.) and in mathematics (Smith and Land, 1980, e.g.) have already been demonstrated. This study attempts to do the same
for science (biology) achievement. A second
objective relates to the effect of vagueness terms
on lesson effectiveness in biology (also shown by
Smith and Land, 1980, for mathematics). Since
Smith and Land gave the perception of clarity
instrument after achievement was known in the 1980
mathematics study, Smith and Bramblett postulate
that feedback regarding success might have
influenced results.

Forty-eight high school biology students were
randomly assigned to one of four groups, defined by
crossing high and low vagueness with two posttest
conditions, one with the posttest preceding the
lesson evaluation instrument and one with the
posttest following the lesson evaluation
instrument. Lessons covered the same content and
differed only in terms of vagueness term frequency.

A twenty-five item criterion referenced
posttest (multiple choice and matching) was given
along with a nine item lesson evaluation form to
rate the teacher over the following: (1) the
teacher was confident; (2) I was confident of the
material being presented; (3) the teacher was
serious about the lesson; (4) the teacher's
explanations were clear to me; (5) the teacher
stayed on the main subject very well; (6) the teacher really knew what he was talking about; (7) the teacher did not seem nervous; (8) the teacher was prepared; and (9) the teacher did not seem lazy. "Smith and Land (1980) reported that this cluster of items enabled students to differentiate significantly between teachers they felt presented clear lessons and teachers they felt presented unclear lessons" (Smith and Bramblett, p. 355).

It should be noted that the authors use the student's perception of clarity here, as is the case in the Ohio State studies following. As an aside, it is puzzling why saying "is caused by" leads to less vagueness or greater clarity than saying "seems to be caused by". It could be the case that the latter is more accurate. The authors never address this possibility.

A 2x2 ANOVA was performed both on achievement and on evaluation ratings. The only significant findings came for the main effect for level of vagueness (for achievement, p<.05; for evaluation, p<.001).

Treating the nine rating items as dependent variables revealed no significant order of testing main effect. The vagueness main effect was
significant (p<.05) for items 1, 3, 5, 6, 7, and 8 (not 4 - clarity).

There are two caveats, however. First, the lessons were short and the posttest measured only short-term retention. Second, the lessons were quite difficult (mean score of 14.33 of 25). The latter might relate to the failure of main effect for vagueness over items 2 (confidence) and 4 (clarity).

This study (along with the one preceding) does extend earlier findings regarding the effects of vagueness on achievement in social studies and mathematics, and it gives support to Smith and Land (1980) regarding the effect of vagueness on student perception of teaching and lesson effectiveness.

Smith and Cotten (1980)

Teacher clarity is examined from the perspective of inhibitors (vagueness terms and discontinuities moving from topic to topic) as effects (singular and joint) on student achievement and lesson presentation. Use of vagueness terms has been discussed earlier. The "discontinuity" hypothesis comes out of the work of Kounin (1970) and Arlin (1979) cited in Smith and Cotten.
indicating negative effects on time-on-task as well as on teacher clarity. Two forms of discontinuity are used here: (1) the teacher interrupting the flow of the lesson with irrelevant announcements (the example given on p. 671 is questionable), and (2) the teacher interjecting "relevant stimuli at irrelevant times in the lesson" (Smith and Cotten, p. 671), thereby creating a sequencing problem.

One hundred seventh grade mathematics students were randomly assigned to one of four groups (n=25) defined by crossing continuity/discontinuity with vagueness terms/no vagueness terms in a 2x2 design. They were presented geometry lessons that were scripted such that they varied only over the two relevant variables (time varied a bit due to addition of vagueness terms and discontinuities, with total time ranging between twelve and fourteen minutes).

A twenty item posttest focusing on application of theorems and concepts presented in the lesson and a six item lesson evaluation form taken from the Smith and Land (1980) study and found to be sensitive to teacher use of vagueness terms served as assessment instruments. The researchers hypothesized a vagueness/discontinuity relationship
Using a 2x2 ANOVA on achievement scores and on evaluation scores yielded a significant main effect on achievement for discontinuity (p<.01) and for vagueness terms (p<.001), and an interaction effect was significant at the .02 level. For evaluation scores, only the vagueness main effect was significant (p<.01).

Again, as was the case in the previous study, caveats of lesson duration and difficulty may have affected results. With this in mind, the findings do support earlier vagueness research and also afford support to the Smith and Land (1980) findings on student perception of lesson vagueness.

This study also supports a causal discontinuity/achievement relationship. The authors hypothesize that this is due to inhibitors of clarity.

Land (1982)

Having established a link between use of mazes and vagueness terms and lower student achievement, the next step in the line of research was to train teachers to reduce their use of these inhibitors to clear teaching. In an attempt at training,
forty-eight secondary education majors in a methods class were split into experimental and control groups by section assignment.

Subjects prepared subject-matter specific lessons of fifteen minutes in duration taught to peers and graded for organization, content coverage, and closeness to objectives and lesson plans. No mention was made of vagueness or mazes.

After the first round of lessons, the instructor explained to the experimental group vagueness terms and mazes and their deleterious effects on learner achievement. Tapes were analyzed in class (as a training method) with respect to vagueness and mazes, and discussions of how to reduced their frequency ensued.

Students in the experimental group had to review their first lesson and rate it on vagueness terms and mazes and compare ratings with the instructor until there was no more than a ten percent difference in quantification.

Control group subjects reviewed their tapes and went over suggestions for improvement, but with no mention of vagueness terms or mazes. The investigators quantified the vagueness terms and mazes on the control tapes.
In the second round of teaching, the experimental group was told to plan to reduce the frequency of vagueness terms and mazes. The results from a 2x2 repeated measure factorial design done separately for dependent variables (1) frequency of vagueness terms and (2) mazes showed significant reduction of vagueness, while the control group held constant. This is also born out by the significant group x lesson number interaction (p<.025). Both groups significantly reduced mazes (p<.005).

The authors urge caution in interpreting these results. There was no random assignment of subjects to groups and subject matter specialties made lesson assignments difficult to control. Lessons were shorter than normal classes and evaluation was present. Given the above, it does seem that teachers can be trained to reduce vagueness terms and that lesson presentation and review can reduce mazes (perhaps due to reduced anxiety and nervousness). It is also important to mention that no attempt was made to assess achievement of learners (peers) or teacher effectiveness/quality other than frequency of vagueness terms and mazes.
Dunkin and Doenau (1980)

This study is an attempt to replicate an earlier study by Dunkin that found, using one lesson in each of twenty-nine classes,

...(a) the classes with abler students received lessons in which more content was covered and less teacher vagueness occurred (sic) (b) classes exposed to more content and less teacher vagueness performed better on the posttest, and (c) the identification of significant process correlates of achievement was not adjusted on the basis of differences in student characteristics. (Dunkin and Doenau, p. 394)

Since the sample was small, the authors decided to replicate the above using "two other series of lessons given in classes drawn from the same pool of twenty-nine classes used in Dunkin's (1978) study" (Dunkin and Doenau, p. 394). Beyond the additional lesson, two measures of student outcome were used - knowledge of subject matter (achievement) and critical thinking - with the former examined both short and long term.

Twenty-four process variables were used, six of which measured content coverage, two were teacher and student vagueness variables defined by Hiller et al. (p. 671) and modified by Doenau, and the rest came from Doenau's Lesson Analysis System. The vagueness variables are "vague teacher words as
% of total teacher words" and "vague student words
as % of total student words" (Dunkin and Doenau,
Table 1, p. 396).

Student characteristics focused on general
ability, prior knowledge in social studies,
anxiety, and dogmatism. Student achievement was
determined by a multiple choice test over the
content of the lesson and a critical thinking test
designed on the Ennis critical thinking model. In
addition, the achievement tests were given twice,
once one day after the lesson (both lessons) and
one week later for the first lesson and three weeks
later for the second lesson. The intention was to
check both short and long term retention. Critical
thinking tests only occurred the day following the
lesson. Unadjusted achievement, residual
achievement A, and residual achievement B were thus
used as product measures.

Using commonality analysis and stepwise
regression analysis, a selection of the results
shows

...process variables most often
associated with student characteristics
in the first lesson were those involving
content coverage and vagueness. Classes
in which students were able, more
knowledgeable, and less dogmatic tended
to be those in which more knowledge test
items were covered in teacher-student interaction and in which less teacher vagueness occurred (Dunkin and Doenau, p. 398).

In terms of process-product relations, content coverage correlated most highly across all three product criteria on lesson one and to a lesser extent on lesson two (in relation to shorter and longer term knowledge criteria). Critical thinking achievement did not correlate highly with these process variables in lesson two.

Findings for teacher vagueness as a substantial negative correlate of achievement in the first lesson held for all three criteria when unadjusted test scores were used but were not maintained at that level when adjusted scores were used. To this extent, Dunkin's (1978) findings were similar to those reported here. Teacher vagueness was negatively correlated with all achievement measures concerning the second lesson; however, it only approached significance in relation to shorter term knowledge adjusted with the class used as the statistical unit.

Student vagueness also appeared to be an important correlate of both kinds of achievement in the first lesson. However, whereas teacher vagueness was found to be negatively correlated with those achievement measures, student vagueness was positively correlated with them. These correlations were at similar levels for both adjusted and unadjusted shorter term and longer term knowledge scores. As for teacher vagueness, student vagueness was a much weaker predictor of achievement in the second lesson. (Dunkin and Doenau, p. 402)
This is a peripheral study, however, as the main interest was to replicate Dunkin's 1978 study, which was concerned first with the use of commonality analysis as a research technique and second with the effects of content coverage in teacher/student interaction on measures of student achievement (knowledge and critical reasoning re: content).

Having reviewed the work on inhibitors to teacher clarity, it appears well-established that a negative relationship exists between those inhibitors (except the use of "OK") and student achievement. What remains is the review of research on teacher clarity that followed from the Rosenshine and Furst (1971) review. The research is designed first to move from a high-inference clarity construct to low-inference indicators of clarity and second to determine the relationship between clarity (high- and low-inference) and select student outcomes.
Low_Inference_Clarity_Studies

Despite the flawed nature of the early clarity work and of the subsequent Rosenshine and Furst review, the teacher clarity variable seems to have some relationship to student achievement, as is obvious from the low-inference work on inhibitors to clarity done by Land, Smith, and others reported above. The line of inquiry reported in this section also flows from the early work reported in Rosenshine (1971) and Rosenshine and Furst (1971), as did the inhibitors to clarity research. The bulk of these studies were done at The Ohio State University under the direction of Cruickshank and Kennedy. In line with this research effort are related studies done at other institutions in conjunction with the Ohio State work. A third set of studies are related in content, but independent from the OSU line of inquiry. The first set of studies reviewed in this section are the OSU studies.

The line of inquiry into the teacher clarity concept started in 1974 with the following questions (among others) in mind:
1. What specific instructional behaviors are perceived by learners as making teaching more clear?
2. Are those specific behaviors related to each other in some way that might permit them to be grouped into "families"?
3. Are some of those behaviors more able than others to discriminate clear teachers from unclear teachers?
4. Can instructional behaviors constituting clarity be observed and measured?
5. What is the relationship between the clarity behaviors and student learning? Student satisfaction?
6. Is teacher clarity stable across content and learners? and
7. Can clarity be taught to teachers?
(Cruickshank and Kennedy, 1985, p. 20)

The first of these studies focused on items one and two above.

_Cruickshank, Myers, and Moenjak (1975)_

Pupils (n=1009) in grades six through nine were asked to think of their most clear teacher and to list those things (about five) the teacher did when teaching clearly. The thinking was that clarity is in the eye of the beholder, and the way to get at student perception of teacher clarity was to ask them.

The above procedure resulted in the generation of thousands of responses that were then inspected for similarity and for face validity, with items
obviously irrelevant to clear teaching (e.g., "is an older woman" or "gives students a lot of work") thrown out. This refinement yielded 110 low-inference behaviors.

Additional subjective inspection of the 110 items led to twelve (thirteen if number ten below is split, as was the case in the original study) "intermediate inference" groups as follows:

1. Providing students with feedback or knowledge of how well they are doing;
2. Teaching things in a related step-by-step manner;
3. Orienting and preparing students for what follows;
4. Providing standards and rules for satisfactory performance;
5. Using a variety of teaching materials;
6. Repeating and stressing directions and difficult points;
7. Demonstrating;
8. Providing practice;
9. Adjusting teaching to the learner and topic;
10. Providing illustrations and examples;
11. Communicating so students understand; and
12. Causing students to organize materials in a meaningful way. (Cruickshank and Kennedy, 1985, p. 21)

A number of questions regarding empirical verification of this list with a new student population, commonality of student responses across grade level, and relative effects of individual behaviors (low and intermediate inference) remained
Bush (1976) and Bush, Kennedy, and Cruickshank (1977)

The primary purpose of the work headed by Bush was twofold: (1) to determine which of the 110 low-inference behaviors of the preceding study were objectively related to one another in intermediate dimensions, or factor structures; and (2) to determine whether and how (if so) the various behaviors discriminate between the most clear teachers and the most unclear teachers.

The sample consisted of 1510 ninth grade students who were randomly grouped into four sections, each of which was to receive a different instrument configuration. The 110 items from the preceding study were randomly split in half and ordered on two fifty-five item instruments. Two groups responded to one fifty-five item array, and two the other array. An additional difference was that one half of the group with the first array responded thinking of their most clear teacher, while the other half responded thinking of their most unclear teacher. The group responding to the second array was divided in like fashion, thus
yielding the four groups.

The data were factor analyzed to get at intermediate factors or groupings of low-inference behaviors. When looking at all the instruments, eight factors fell out as follows:

1. Explaining through written or verbal examples;
2. Personalizing instruction via multiple teaching strategies;
3. Task orientation;
4. Verbal fluency;
5. Helping students organize their work;
6. Providing for student understanding via explanation;
7. Synthesis of content and providing clues to its relevance; and
8. Verbal repetition (Bush et al., p. 54).

A second finding was that some behaviors were better discriminators of teacher clarity than others, as determined by discriminant analysis. Among the best (prime) discriminators were: (1) gives students individual help; (2) explains something and then stops so students can think about it; (3) explains the work to be done and how to do it; (4) repeats questions and explanations if
students do not understand; (5) asks students before they start to work if they know what to do and how to do it; (6) gives explanations that students understand; (7) teaches at a pace appropriate to the topic and the student; (8) takes time when explaining; (9) answers student questions; and (10) stresses difficult points (Bush et al., p.57).

Bush et al. note that the best discriminators loaded on one of two intermediate factors — explaining through written or verbal examples and providing for student understanding via explanation — suggesting that "the significant intermediate dimensions of teacher clarity pertain to the teacher acts of: (a) explaining ideas and directions and (b) using ample illustrations during the process of explaining ideas and directions" (p.57).

Canonical analyses were employed to explore multivariate relationships between the 110 behaviors and selected demographic variables. Teacher age (younger over older), sex of teacher, and sex of pupil may play a role in the dynamics of student perception of teacher clarity.
Kennedy, Cruickshank, Bush, and Myers (1978)

To cross-validate the preceding study and to determine the generalizability of the findings, a study was done (Kennedy, Cruickshank, Bush, and Myers, 1978) that employed refined instrumentation and a wider sample of 1,363 students from Ohio, Tennessee, and Australia. The instrument consisted of the forty-three most discriminating statements from the original Bush study and eighteen additional items generated by the experimentors to fill apparent gaps.

The array of sixty-one low-inference behavioral statements was presented to subjects who responded to half of the items thinking in terms of a clear teacher, and the other half an unclear teacher. Intermediate inference factors of clarity determined by factor analysis were similar to the initial study, but four instead of eight factors were most prominent. They were: (1) "assesses student learning", (2) "provides student opportunity", (3) "uses examples", and (4) "reviews and organizes" (Kennedy et al., p. 7). Further, the factors were similar across geographic locations, indicating generalizability of the clarity construct.
Discriminant analysis to determine prime discriminators yielded twenty-eight low-inference behaviors, with the ten most powerful listed here: (1) "explains things simply", (2) "gives explanations we understand", (3) teaches at a pace appropriate to the topic and to us", (4) "stays with the topic until we understand", (5) "tries to find out if we don’t understand and then repeats things", (6) "teaches step-by-step", (7) "describes the work to be done and how to do it", (8) "asks if we know what to do and how to do it", (9) "repeats things when we don’t understand", and (10) "explains something and then works an example" (Kennedy et al., p. 6).

There are obvious similarities to the items in the original study, but identity was not expected due to instrument revision. Also, where the original study found the ten best discriminators loaded on only two factors, the top ten load across over four factors here. One problem that ensued was that four of the prime discriminators above (numbers 1, 2, 8, and 9) did not fit any factor because they did not meet the factor loading coefficient standard. Nonetheless, the discriminating power of these items was very high
in terms of clear versus unclear teachers (all multiple r's in excess of .80), accounting for at least "65% of the variance in student selection of their most clear and unclear teacher" (Kennedy et al., p. 5).

A key question in all prior work on clarity in the Ohio State program was the ability of students to respond in terms of their "most clear" teacher and not their "best" or "most effective" teacher. Canonical analysis revealed a modest and positive covariation between student selection of their most clear and unclear teacher and their assessment of how well or how poorly they performed in that teacher's class. It can be said, therefore, that student responses to the behavioral statements discriminate extremely well between clear and unclear targeted teachers, and that targeted clear teachers also tend to be teachers for whom the student has performed well, and vice versa. The modest nature of this covariation, however, was interpreted as suggesting that the students in this study did not confuse the concept of most clear teacher with more generic constructs of good teacher and favorite teacher (particularly one who awards high grades). (Kennedy et al., p. 8)

A major question not answered by the Bush, Bush et al., and Kennedy et al. work is the nature of the effect of perceived clarity on the teaching learning process. Does it function as a causal
link, a mediating variable, between the teacher's actions and the student's performance? It is this question and the question of observing and recording teacher clarity that the next study addresses.


The fourth study reviewed here and reported in Hines (1981) and in Hines et al. (1985) investigated student perception of teacher clarity at the college level (as opposed to junior high), the ability to observe and rate (over low and high inference levels) the clarity construct, and the relationships between and among teacher clarity as perceived by students and their resultant achievement and satisfaction with the teaching.

To address the first concern, Hines essentially replicated the Kennedy et al. work using college students and found three (four in the original Hines, 1981 report of the study) very strong factors: (1) provides for student understanding and assimilation of instructional content, (2) explains/demonstrates how to do the work by use of examples, and (3) structures
instruction and instructional content/presents content in a logical sequence (Hines et al., 1985).
The last factor was new to the list of strong families of behaviors.

Forty-two of the Bush et al./Kennedy et al. prime discriminators, along with eleven items generated by the investigator, were employed on the instrument. Many of these behaviors were associated with the three major factors. The results at the college level were very similar to the junior high findings.

To determine the relationship of clarity to achievement and satisfaction, preservice teachers (n=32) taught the same lesson (maximum time of instruction - twenty-five minutes) to four to six peers in a Reflective Teaching setting (Cruickshank, Kennedy, Williams, Holton, and Fay, 1981). When the lesson was completed, learners were assessed for achievement and satisfaction with the teaching. In addition, learners and teachers rated the teaching over twenty-nine low-inference clarity items in the manner of Kennedy et al.

Observers trained on the clarity instrument (the array of low-inference indicators distilled out of the preceding studies) also rated the
videotapes of the teaching sessions over not only the low-inference items (eighteen of which were deemed countable, and eleven rated), but also over intermediate and high-inference levels. The intermediate level dimensions were essentially the three factors cited above as very strong. This three-factor listing is an editorial change from the Hines (1981) study. When the Hines instrument is discussed in Chapter IV, the original four-way division will be employed.

All clarity measures at all levels of inference showed significant positive relationships \((p<.05)\) to learner achievement and satisfaction across all measurement sources. The student ratings were most closely tied to satisfaction scores and the trained observer ratings most closely to achievement.

Path analyses were performed to determine whether there are grounds for claims of causal or mediating effects of perceived clarity on achievement and satisfaction. The results indicate that satisfaction scores are affected positively by student perception of clarity and achievement seems related to observer ratings of clarity.
The Williams study, fifth in the O.S.U. line, looked at the stability of clarity over time across different subject matter and groups of students. The study had two primary questions:

1. Will there be significant changes in the clarity behavior of teachers when they teach (a) the same material to the same students on different occasions a week apart; (b) the same material to different students on different occasions; (c) different material to the same students on different occasions; and (d) different material to different students on different occasions? and

2. What relationships exist between consistently clear as opposed to consistently unclear teachers with regard to learner achievement and satisfaction?

To answer number one above, fifty-two preservice teachers grouped over the four conditions taught the same (or different) Reflective Teaching lesson to the same (or different) group of four to six peers. Following the lesson, learners (n=456) completed a criterion referenced posttest and the post-instruction clarity questionnaire developed by Hines (1981).
The lessons were videotaped, allowing for tabulation of clarity behaviors by trained clarity raters. Over all three levels of clarity rating (low, intermediate, and high) observers saw relative stability of clarity, with minor exceptions. The learner reactions were in line with the observer ratings, as well.

Having established stability, the next task was to determine the relationships between consistently clear versus unclear teachers with respect to achievement and satisfaction. Learner group mean scores on the posttest and question eighteen on the post-instruction questionnaire ("I feel satisfied with this learning experience") were analyzed, with teachers high on clarity across lessons producing gains in achievement over lessons one and two, and teachers low on clarity producing decreases in achievement from lessons one to two. The ratings for satisfaction also favored the clear teachers.

As noted by Cruickshank and Kennedy (1985), a number of questions remain at this juncture of the research program.
Would stability hold over longer periods of time? Over different domains of learning, e.g., psychomotor, affective? Will stability occur in natural classrooms? Are there significant differences between consistently clear and unclear teachers related to pupil achievement and satisfaction? Is the difference between consistently clear and unclear teachers a function of frequency or quality of clarity behaviors? (p. 32)

Gloeckner (1983)

This, the sixth study in the Ohio State line, investigated (1) whether clarity can be taught to preservice teachers and (2) whether teachers trained to be clear would perform better in terms of achievement and satisfaction than those not so trained. To assess number one, Gloeckner developed and field-tested a training unit that was administered to twenty-five preservice teachers (one section of a general methods course). The control group (n=22) was another section of the same course.

After ten hours of training, all subjects taught the same three-minute Reflective Teaching lesson to their whole class. The lessons were videotaped and analyzed for clarity behaviors by trained observers. The results indicated a significantly higher frequency of clarity behaviors
in the experimental group than in the control group (who showed no pretest difference in clarity level).

To determine the effect of the training on achievement and satisfaction, the experimental group was compared to a new group of twenty-four controls taken from four sections of the same general methods course. Each taught one of two fifteen minute Reflective Teaching Lessons, with one third of the lessons videotaped. At the completion of the lesson, learners assessed the teachers over the post-instruction clarity questionnaire (Hines, 1981), responded to a question of their degree of satisfaction with the teaching, and took a criterion referenced achievement test.

The results showed no superiority of trained over untrained teachers with respect to achievement or satisfaction, nor were they judged to be more clear. Trained observer ratings concurred, showing little or no transfer of the training.

The question of why the increased ability to perform clearly was not evident in the test setting is puzzling. One possibility lies in the investigator's method, with the trained teachers
teaching unfamiliar students and the untrained teaching familiar ones. The instructions may have been another source of difficulty, with the trainees told to perform as many clarity behaviors as possible in the first three minute session and not to worry about a posttest. In the second part of the study, there was a posttest and competition was stressed. This may have led the trained teachers to lose focus on clarity, while the untrained teachers unknowingly raised their clarity levels.

One leaves the O.S.U. studies with a sense that the transfer of clarity to previously unclear teachers via training is a big question. Whether the focus should be on intensity, method, or duration of training, or on some combination is a matter of speculation at this point. Further, the entry-level ability/potential to be clear may interact with the above and with factors like familiarity of teacher with the learners and degree of pressure to perform (competition), increasing the complexity of an already complex phenomenon.
The next three studies were done not at Ohio State, but at other institutions. They are, however, related directly to the O.S.U. work.

Smith (1978)

As was the intent of Bush, Bush et al., and Kennedy et al., Smith attempted to identify low-inference components that make up the clarity variable ("clarity of presentation" in this case). After a review of relevant research, forty-one potential behaviors were rated by a thirty-one member panel of experts in teacher education over three dimensions: (a) value, (b) learnability, and (c) measurability. A manual was constructed of the surviving items and was used to rate the teaching of ninety-nine community college instructors. The analysis of these ratings yielded ten promising low-inference behaviors clustered in three factors ("organization", "makes organization of the presentation explicit to the students", and "uses questioning skills, examples"). The behaviors are:

1. uses examples with explicit referents;
2. lets students ask questions;
3. answers student questions;
4. asks questions related to material being
taught;

5. encourages students to ask questions;
6. shares over-all structure of the lecture with the students;
7. teaches step-by-step;
8. prepares students for what is upcoming;
9. uses verbal markers of importance; and
10. summarizes material at appropriate points in the presentation.

Holland (1979)

The interest of the Holland study is in a further analysis of the Kennedy et al. data in terms of comparing teachers of mathematics or science with social studies or English teachers. The hypothesis tested was whether science/mathematics teachers, because of the nature of their subject matter ("hierarchical", with "each step based upon a preceding step") would be more or less clear than social studies/English teachers, whose subject matter tends not to be so hierarchical. He also looked at the geographical comparisons (Ohio, Tennessee, and Australia) made in the Kennedy et al. study for differences.
The results showed that there was "strong support for the stability of clarity across subject areas and geographic regions" (p. 121) at the low and intermediate levels of inference. Holland did find a seemingly greater importance of clarity for the math/science teachers, perhaps due to the behaviors being more noticeable by students in those classes, or due to greater overall importance, or perhaps because those teachers simply performed the behaviors more frequently. Independent of the above differences, this study adds weight to the O.S.U. findings, especially those of Kennedy et al. and of Williams.

White (1979)

The White study involved administering the clarity instrument developed by Kennedy et al. to 306 high school pupils who were to rate their most clear or unclear teacher. Using factor analysis procedures, White found essentially the same four factors as the earlier Ohio State studies, and she selected the twelve low-inference behaviors with the highest loadings (.50 or above) to create an instrument that would then be used to rate teachers. Cruickshank and Kennedy (1985) point out
that White did not choose items that were prime
discriminators necessarily. In fact, only six of
the twelve are found in the Kennedy et al. list of
twenty-eight. This is a point of criticism in the
eyes of Hines (1981) and Williams (1983) as well,
pointing out that the results might be negatively
biased due to this error.

Preservice teachers (n=12) taught the same
lesson to peers who were tested over content
material at the end of instruction. The teachers
were rated with the clarity instrument and the
clarity ratings were correlated with the learner
achievement scores. The results show a negative
correlation (r=-.4988, p=.049) between clarity and
achievement, claiming that clear teachers in this
group often taught irrelevant material. She went
on to claim the need to consider the student's
opportunity to learn criterion material as a
critical addition to the concept of teacher
clarity, a point also made in a review done with
McCaleb (McCaleb and White, 1979, p. 29). They
claim that, in addition to choosing low-inference
indicators, raters should have content knowledge
and teaching experience, teacher "dynamism" should
be separated from clarity, and opportunity to learn
ought to accompany any notion of clarity.

The last group of studies reviewed in this section contains clarity investigations that were done independently of the Ohio State line.

**French-Lazovik (1974)**

The main question here appears to be, "In the case of student judgments, what kind of teaching do students evaluate most highly?" (p. 373). Two studies, conducted nearly fifteen years apart, are reviewed and yield almost identical results.

In each of the studies, students (nearly 10,000) were asked to rate teachers (nearly 200) and then to judge the teacher's effectiveness in the classroom. The resulting lists of items from the ranking scale are nearly identical, including items "related to clarity, organization, teacher's knowledge, use of examples, arousal or broadening of interests, and motivation or stimulation of thought" (French-Lazovik, p. 377).

It is suggested that the ten items that head the list fit three more general categories: clarity of exposition, arousal of student interest, and motivation or stimulation of thinking (pp. 377 and 382). Clarity of exposition contains the following items:
Interprets difficult or abstract ideas clearly;  
Makes good use of examples and illustrations;  
Has presented the course in an organized manner; and  
Inspires confidence in his/her knowledge of the subject.

French-Lazovik concludes that "strong evidence" is offered for clarity, along with arousal of interest and motivation for intellectual activity as "the major determinants of students' general evaluation of teaching effectiveness" (p. 382).

Frey, Leonard, and Beatty (1975)

This study reports findings of three research studies conducted to examine the relationship between student evaluation of instruction and the effectiveness of the teacher. Introductory sections of calculus (21) and educational psychology (10), total enrollment of 778, were asked to rate instructors using the twenty-one item Endeavor Instructional Rating Form, which contains three items under the label "clarity of presentations". These ratings were correlated with end of term common exam scores.
Using correlational analysis, three rating scale factors seemed prominent: student accomplishment (r=.59), presentation clarity (r=.58), and organization-planning (r=.51). There was no mention of significance, however. Presentation clarity was indicated by responses to items dealing with "presentations clarified material", "presented clearly and summarized", and "good use of examples". While the correlations were weaker than an earlier study mentioned (Frey, 1973, not reviewed here), they are in the same direction and add weight to the notion that student ratings of instruction over at least the three factors above correlate highly with achievement.

**Good and Grouws (1977)**

Eighteen grade four mathematics teachers were studied to determine whether differences in teacher behavior could be identified between teachers who differed in effectiveness. Using mathematics residual gain scores from the Iowa Test of Basic Skills of students over the previous two years, nine teachers were categorized as relatively high in effectiveness and nine relatively low, based on the class averages of year one compared to year
two.

Observation data were collected by trained observers who made six or seven visits to each teacher's classroom. Data were collected on (1) how mathematics instructional time was utilized, (2) low-inference descriptors of teacher-student interaction patterns, (3) high-inference variables, and (4) descriptions of materials and homework assignments.

Process data were analyzed using a one-way ANOVA to determine teacher differences, yielding significant results in a number of areas, including "general clarity of instruction".

One of the necessary skills for effective whole class instruction is the ability to make clear presentations. Highs regularly exceeded lows in clarity scores. They generally introduced and explained material more clearly than did lows. (Good and Grouws, p. 52)

The study concludes by claiming teaching effectiveness to be "strongly associated" with a number of behaviors, prominent among them is "general clarity of instruction and availability of information as needed" (p. 53).
The purpose of this study was "to experimentally manipulate potential components of clarity of explanation (as identified by factor analysis studies) and measure their effects on student achievement and teacher rating forms" (Evans and Guyman, p. 4). Student attitudes toward the course were also considered.

Nineteen college student volunteers were randomly assigned to one of two instructional groups or one control group. Lectures in the two experimental groups were either clear or unclear based on factor analysis of a videotaped lecture of a teacher who was rated low on clarity. The original lecture was then reworded to provide a clear rendering of the content. The operational definition of clarity had two components: (1) appropriate use of examples and (2) sequencing of instruction. Control subjects were not subjected to the lecture in either form and were given only the posttest.

The results indicate that clear lecture students scored significantly higher than unclear lecture students on the posttest over the content (p<.05). Further, those in the clear lecture group
gave significantly higher teacher clarity ratings ($p<.01$). Evans and Guymon state that their study supports other factor analytic studies in which clarity of presentation was found to involve the use of examples and solid organizational structure.

**Murray (1983)**

The purpose here was to determine which low-inference behaviors determine student evaluations of teachers over high-inference variables such as "clarity" and "organization".

The present study compared the frequency of occurrence of 60 low-inference teaching behaviors in groups of university lecturers who had consistently received either low, medium, or high "overall effectiveness" ratings from students in previous courses. ...(and) low-inference teaching behaviors were independently recorded by trained observers who unobtrusively visited regular classes taught by participating lecturers. (Murray, p. 139)

The lecturers (n=54) fell neatly into groups of eighteen over the low, medium, and high rating breakdown. The observation instrument (Teacher Behaviors Inventory) consists of sixty items covering eight categories: speech, nonverbal behavior, explanation, organization, interest, task orientation, rapport, and participation. These
categories differed greatly from the factor analysis results, however.

When factor analysis was performed on the individual classroom observers' ratings (to get acceptable subject/variable ratio), "nine readily interpretable factors" (p. 143) were identified. Three of the nine (clarity, enthusiasm, and rapport) showed significant variation across low, medium, and high groups (p<.01 in each case), with increased frequency as one moves from low to high. When pairwise comparisons were made, significant results obtained between low and medium groups for clarity and rapport, and between medium and high for enthusiasm.

This pattern of results suggests that whereas Clarity and Rapport are important factors in differentiating a medium-rated or "average" lecturer from a low-rated or "poor" lecturer, the critical factor in differentiating an "outstanding" lecturer from an "average" lecture is enthusiasm, which has been interpreted here as the use of stimulus variation and expressive behavior to elicit student attention and interest. (Murray, pp. 143 and 145)

It should be noted that the high-rated teachers scored high on clarity, but so did the medium-rated teachers. The difference between the two, at least in terms of student ratings, was the addition of enthusiasm. Perhaps we are seeing a
number of necessary conditions for high evaluations, no one sufficient by itself. Murray goes on to state that, using an orthogonal polynomials analysis, it appears that clarity at some minimal level is a prerequisite to students perceiving a teacher as enthusiastic. Teachers high on clarity could be low on enthusiasm, but not the opposite. Further, when enthusiasm was controlled for via semipartial correlation, "the correlation between Clarity scores and overall effectiveness ratings dropped from .37 to .16", but "the correlation between enthusiasm scores and overall effectiveness ratings was essentially unchanged (.64 vs. .62) when Clarity was statistically controlled" (pp. 145-46).

While no association is made with respect student achievement, this study is included in this review because it adds credence to the use of student perception ratings of teacher process variables. Further, it begins to speculate about the complex relationships between variables such as clarity and enthusiasm, bringing in the notion of the intervening variable (here "attention-getting") posited by Doyle.
Summary and Discussion

Research in teacher effectiveness is marked by a long history of studies, the bulk of which, prior to 1960, yielded little useful information. Once the inquiry moved away from universal teacher characteristics or personality factors as they relate to administrator ratings and student outcomes, some advances can be seen. The advent of the early process-product studies, using terminology from the Mitzel (1960) model, marks the beginning of this advance.

Even greater strides are made when combinations of variables - teacher and student processes, context, and presage - are tested as they relate to student achievement and other desired outcomes. Paralleling this shift in independent variable focus is an increased sophistication in design and conceptualization, better approximating the complexity of the teaching/learning process.

A number of problems persist, however. Among them, as noted by Hines (1981), are a lack of an adequate theory to guide the research and poor operational definitions of the variables considered.
"most promising" with respect to resultant student achievement. One might add the limited nature of dependent variables — generally low-level achievement tests and not measures of higher-level cognitive processes such as the ability to think and reason critically, for example.

The research, while taking elements of context into the equation, still adopts an individualistic, psychological orientation to teaching and learning, ignoring potential insights of recent work done on the effect of gender, race, and class on student achievement, as well. The phenomena of cultural production and reproduction as played out in schools could shed a great deal of light on why some students succeed and others fail in school ("why working class kids get working class jobs", in the words of Paul Willis, 1977). As yet, effectiveness literature remains undisturbed by this omission.

Flowing from these generic studies of teacher effectiveness are two rather specific lines of inquiry: studies of teacher clarity and studies of inhibitors to teacher clarity. Each shows great promise. A problem arises with the clarity construct and its relationship to student
achievement, however. Where once clarity seemed to have a great deal of support, when the construct and the early supporting studies are scrutinized, much of the support and even the conceptualization of the construct is called into question.

Studies of teacher clarity (and the lack of clarity) done in the last ten years have made progress toward establishing a firm link between clarity and achievement (narrowly defined), and have taken initial steps toward a low-inference array of behaviors that might be indicative of the high-inference and slippery global notion of 'clarity'. While this effort is both laudable and useful, problems arise.

First, it is not yet apparent how one determines which items on the Hines (1981) Clarity Observation Instrument (COI) or on the Kennedy et al. list of prime discriminators are justifiably low-inference indicators of clear teaching and which are not. How does one determine clear teaching, say, from good teaching or from teaching that leads to student understanding? If all we mean by 'clear teaching' is good teaching, or teaching that brings about understanding, then the definition of 'clear teaching' incorporates the
outcome measure that is of interest in the studies. Such is not desirable, but is a possibility, given the global definition of clarity used by Hines et al. (1985): "Clear teaching was viewed as a state in which a teacher who is in command of the subject matter to be transmitted is able to do that which is required to communicate with learners successfully" (p.88).

Second, and relatedly, what techniques might be applied to the research as it stands to reanalyze the clarity (and inhibitors to clarity) construct? How might one synthesize the empirical work on operationalizing ‘clarity’ with other philosophical analyses of the concept and related terms?

Third, how do the two lines of research - on clarity and on the inhibitors to clarity - relate to one another, operationally and conceptually? Is it the case, as some researchers in this series seem to believe, that the absence of inhibitors to clarity (VVRs) is sufficient for one to assume a clear presentation has been made?
Fourth, in addressing the above, one might be better able to assess what has been left out of the research that might be helpful, interesting, and/or important. Are significant issues ignored by the present lines of research? Does measurability limit the breadth of the constructs at issue, at the expense of any meaningful connection to teaching and learning "in the world"?

Fifth, researchers stipulate narrower uses of terms in the research to provide for standard notions of rigor, replicability, and so on. That these terms are not used exactly as they are in ordinary language is not necessarily bad, and may be good. But one must beware that, in the course of relating the research to practice, the consumer is made aware of these research stipulations and is not led to equate 'clarity' operationally with 'clarity' in the ordinary use of the term.

Finally, one must address the issue of prescription. Once clear teaching is understood conceptually and as it (whatever "it" is) relates to student outcomes of interest, how are we then to relate such knowledge to the practice of teaching and of teacher education? Description, once achieved, does not imply prescription. Whether and
how clarity relates to the content of teacher education programs are new issues with completely different sets of questions and modes of answering those questions from the problem of description. Yet if we are to add to Cruickshank’s model of research on teacher education, such issues and questions need to be addressed. Perhaps most important among these questions are two: How, if at all, can teachers be taught to be clear (addressed in part by Bloekner, 1983)? and, When in the course of teaching should teachers be clear?

Using the methods of the philosopher (primarily) the above questions are addressed. Answering them all may be expecting too much. Not asking them, however, is bad science.
The central issue in this study is the relationship between 'clarity' and 'inhibitors to clarity' in terms of the teaching/learning process. There is a variety of ways to approach this question. What we see in the literature is a line of empirical, low-inference study of each area individually. What has not been done at all, however, is a treatment of the concepts involved in terms of the logical properties of each and the relationship of one to the other. In so doing, one might check the operational definitions developed empirically against an ordinary language analysis to make sure that only notions intended to be studied are included in the instrument that will be used to measure 'clarity' (or to determine what is being captured by the instrument).

For instance, if one wishes to study clarity and the instrument used for such a study includes items that have no conceptual relationship to
'clarity', then the results of the study could be misleading. One is left unsure of the relative effects of clear teaching as opposed to the effects of the non-clarity items. The pitfalls of moving from problems stated in ordinary language to research questions stated in operational terms to results of research and suggestions for practice reported in ordinary language are central to this analysis.

What is proposed in this line of inquiry is an analysis of the concepts 'clarity' and 'inhibitors to clarity' (including 'vagueness' and 'ambiguity') in terms of their logical properties within the teaching/learning context. Looked at in this fashion, one is concerned with how 'clear' versus 'unclear teaching' is defined and used within the research, how it is ordinarily used, how these uses differ, and what difference the differing makes. The present study employs philosophical analysis to explore the logical terrain of 'clarity' and 'inhibitors to clarity' with respect to teaching.
The methodology employed here is discussed in several different texts and in a variety of ways (Chambers, 1983; Thompson, 1972; Straughan, 1982; Wilson, 1963; e.g.). For the sake of simplicity and brevity, Wilson is the primary source for this chapter, but any of the others could easily be substituted and all are appropriate to the task of methodological explication.

Two additional things need to be said to distinguish philosophical methodology from methodology employed in empirical research. First, when one describes methods of doing empirical research, one ordinarily includes the relevant population and sampling techniques, research design, and statistical manipulations called for in the study. There is generally a clear-cut sequence of operations to be followed from the collection of data to the interpretation of results. While this might be more a reconstructed logic than a logic in use, it nonetheless is the way empirical methodology is reported.

Such is not the case with philosophical analysis. 'Method' is here used more in the sense
of "rules of thumb" or general operating principles employed as the investigator sees fit, depending on the flow of the analysis. The justification for choice of procedures is found in the overall quality of analysis that results. While the same is true in part for empirical research, method and results are far less distinct and separable in philosophical analysis than they are in empirical research.

Second, philosophical analysis of an area of study (teacher clarity, e.g.) is not simply a different way to look at "the same stuff". In a very real way, while the general topic remains "teacher clarity", what is looked at is quite different. One might make the distinction in terms of a first versus second order question (Peters, pp. x-xiii). First order questions (or questions of substance) look to the substantive issues of interest. In the research reported here, such questions include "What behaviors are performed by clear as opposed to unclear teachers?" and "What is the relationship of clear/unclear teaching to student outcomes?".

A second order question (also called a conceptual, philosophical, prior, or meta-
question) looks not to substantive issues but to the logical properties of the terminology of import. Rather than focus on behaviors employed by clear teachers, 'clear teaching' as a concept becomes the point of interest. The question is one of meta-language, a terminological analysis deemed logically (but not necessarily temporally) prior to the substantive question. Until one understands the conceptual terrain covered by the relevant terminology, the meaning of the substantive question is not certain. Until one understands what counts as 'clear teaching', one cannot be sure that 'clarity' is the real variable of interest relative to student outcomes.

With these two qualifiers - that 'method' is here more rules of thumb than strict operating principles and that this is not a new look at the same material but a look at wholly different material - one can proceed to a description of philosophical analysis. While Wilson is the primary source, others are equally appropriate.

Wilson describes philosophical analysis as a set of skills and techniques whose identity and purpose are difficult to pinpoint. They are unlike typical academic tasks of "solving quadratic
equations, doing Latin prose, or translating German into English" (p. 1). In these activities, we know what we are supposed to do and we know where to go for help if and when we run into trouble. Such is not the case for philosophical analysis. The question of methodology can be approached and techniques of analysis can be taught, however.

What are these techniques like? They are not like 'subjects' such as Latin or mathematics, which have clear-cut and well-defined rules, and in which answers are indisputably right or wrong. They are rather more like specific skills such as the ability to swim well or play a good game of football. But they are most of all like general skills which have wide application, such as the skills we refer to when we talk of 'seamanship', or 'having a good eye', or 'being able to express oneself'. These general skills are useful in a great many different activities; thus seamanship is useful in sailing, manning a lifeboat, rescuing people from a wreck, and so on; having a good eye is a great advantage in any ball game; and the ability to express oneself in words helps us in writing essays, letters and reports, as well as in making our feelings and needs clear to other people. Yet though the skills come into many different activities, we can see that the same skills are at work in each case. (Wilson, 1963, pp. 1-2)

A step in the right direction is taken when one considers the type of question answered by philosophical analysis. Think about the following questions:
Is teaching a profession?  
Is Ms. Smith a good teacher?  
Is individualized instruction desirable?  
How can teachers become more effective?

Each of these questions is quite complex. One reason for the complexity is that to answer the substantive (first order) question above, a number of conceptual (second order) questions need to be addressed. What do we mean by 'profession', 'good teacher', 'individualized instruction' (and 'desirable'), and 'effective'? These are logically prior to the questions of substance, and the answer to these second order questions will affect the answers to the first order questions. We need, for example, first to address what notions of effectiveness, or intended results, we are employing before we can begin to prescribe teacher behaviors or qualities to achieve those results. The point is that we must often ask how words are used before we can address the substantive issue.

(Soltis makes the same point regarding "substantive questions" versus "metaquestions", as does Engel with respect to "factual disputes" versus "verbal disputes".)

A common objection to this focus on language is that one is "just quibbling about words" or
engaging "only in semantics" (Engel, 1976). There are two problems with this objection. First, to use the words "only" and "just quibbling" is to beg the question regarding the importance of the discussion. If one accepts these terms as accurate, then the question of the importance of such inquiry is already answered negatively. Second, while the issue initially is one of word use, the answer to this verbal question can greatly affect the broader question of substance.

One's notion of what is "desirable" and what is to count as "individualized instruction" will most certainly affect the answer to the question on the desirability of individualized instruction. If, for example, one will accept only a tutorial, one-on-one approach to teaching to count as individualization, it is likely that no school system could balance the cost of such an endeavor against gains in outcomes, independent of how 'desired outcomes' is defined. Similarly, Ms. Smith is or is not a good teacher as much as a result of what we mean by 'good teacher' as of her own abilities.

We have a similar problem in the present study. The use of 'clarity' and of 'vagueness' and
'ambiguity' in ordinary language, combined with the context of the present lines of inquiry, represent the starting point for methodology. Once one recognizes the need for conceptual, or logically prior questions, and once one is able to isolate and articulate them, how does one proceed?

The first response is likely to be "Look it up in a dictionary." This is wholly reasonable, as the dictionary "gives us the conventions in accords with which we talk and write" (Ennis, p. 154). The notion of dictionary definitions will be addressed in greater detail in Chapter VI. What is significant here is that, while a dictionary is often a good place to start when one is puzzled over the meaning of a term, there are problems.

First, dictionary definitions are circular in some instances and for some people. Difficult words may be defined in terms of equally difficult words, putting the user in a quandry. It is possible to pursue leads in a variety of dictionaries, leading to terminological illumination, but the problem exists, nonetheless.

Second, dictionaries often lose some aspects or nuances of terms. In addition, dictionaries will sometimes disagree with each other and some
will be out of date, as the use of terms changes over time. These dangers are addressed in detail by Ennis (pp. 155-161). The point here is not to relegate the dictionary to useless retirement. Rather one needs to use dictionaries intelligently and realize limitations.

If one were to look 'clarity' up in a dictionary, one would find uses of the term, perhaps (some of which might be helpful), but one may not find the conditions for use. That is, one might get little in the way of specific conditions that are necessary and/or sufficient for the term 'clarity' to be used. Further, one would gain even less insight into the way 'clarity' functions with 'teaching'; that is, what can now be said about when one would use the term or phrase 'clear teaching' or 'teacher clarity'?

It seems that dictionaries are especially helpful when one is wholly mystified by the use of a term. But one can be puzzled by uses of terms that are in many ways quite familiar. For example, we all know something of 'justice', 'democracy', and 'freedom', yet the actual conditions for use, or employment of these terms in difficult and/or borderline cases can be just as puzzling as a
wholly obscure term.

Now, when I meet a word with which I am entirely unfamiliar, I find it a good plan to look it up in the dictionary and find out what someone thinks it means. But when I have frequently to use words with which everyone is perfectly familiar — words like "cause" and "liberty" and "progress" and "government" — when I have to use words of this sort which everyone knows perfectly well, the wise thing to do is to take a week off and think about them. (Becker, 1955, p. 328)

Becker's resolution to the problem of conceptual clarification may appear extreme, but it points nonetheless to the need to examine the use of so-called "common" words, in part because of their commonality. Nuances and distinctions may be lost due to the belief that "everybody knows" what the words mean.

To answer questions of concept, one must look at cases illustrative of the way terms are used and, by examining the features of those cases, come to some conclusions (or hypotheses) as to the conditions required for proper employment of the term(s) in question. It will be important in this regard to address how words come to mean what they do, and this point will be taken up in detail in Chapter VI. It is to this end of clarification of terminology that one can employ philosophical
Model and Contrary Cases

The typical place to start an analysis of a concept (beyond the removal of obvious ambiguities at the outset) is with a model case (also called a "paradigm case" by some - Munson, pp. 50-52). A model case is "an instance which we are absolutely sure is an instance of the concept" (Wilson, 1963, p. 28), something any intelligent or competent user of the language would agree is an example of that which is being discussed.

A similar process is at work, from an opposite direction, via the use of contrary cases. In contrary cases, one attempts to construct examples in which users of the language would agree that the concept at issue certainly does \textit{not} apply, at least not in the same universe of discourse.

In describing in some detail a number of model cases, one might arrive at a tentative list of essential characteristics or conditions, common to all cases, that could serve at least temporarily as conditions for use; and at the same time, one might eliminate non-essential features. As in the use of model cases, one can compare contrary cases to see
"What is missing", and further, in combining model and contrary cases, one is able to refine more completely the essential conditions (and perhaps limits) for use.

To illustrate the above, consider the concept 'justice'. It is recognized that 'justice' is a difficult concept to pin down. But even with complex and difficult concepts at least some degree of clarification can be derived rather quickly. A model case of 'justice' might be a young boy being punished for transgressing a school rule. Similarly, a person who knowingly and willingly commits a crime and is punished with a jail sentence is likely to be said to have been treated justly. A third case might be a generous act being rewarded with praise. While one would probably wish to elaborate on these cases, providing context and details (e.g., Did the student know the rules of the school? Did the student break the rule intentionally?), the above provides a tentative list of features that seems to apply to 'justice'. These include: intentionality on the part of the perpetrator, the notion of retribution, and some sense of proportionality (Did the student receive the death penalty for being late for class? If so,
then the first case is not a case of 'justice', due to a lack of proportionality in terms of the severe punishment for a relatively minor crime).

The use of contrary cases might include being punished for a crime that one did not commit, or that one committed in a state of insanity (and hence lacked responsibility). A second possibility is two people committing the same crime with all other relevant circumstances being equal, and yet receiving completely different punishments (or with one being punished and the other not). A third might be a person being praised for wrong-doing, or punished for an heroic act. Again, notions of intentionality, retribution, and proportionality are reinforced as essential to the concept of 'justice' (Wilson, 1963, pp. 29-30). Personal responsibility, a condition missed in the initial model cases, appears from the contrary cases to be an additional concern.

The Issue of Related Cases

Wilson (1963, p. 30) points out that it is very difficult to consider a complex concept such as 'justice' without dealing with related cases. Cases of 'justice' will almost always deal with
notions of rewards and punishments and with the idea of deserving what one gets. In thinking about whether a person does or does not deserve resultant treatment, one goes a long way toward recognizing a situation of justice or injustice.

A technique for considering related cases is called the "A-without-B procedure" (Green, pp. 17-18). The general purpose of this procedure is to determine whether or not a related concept is a necessary condition for the use of the term in question. Put differently, and in the context of the above, is it possible to speak of 'justice' without also speaking of deserving what results accrue from a given behavior? If not, then 'deserving' is a part of, a necessary condition for, the use of 'justice'. If one is able to imagine a case of 'justice' that does not require the notion of 'deserving', then 'deserving' is not a necessary condition for 'justice'.

In general terms, Green lays out four "methodological principles" that cover the A-without-B procedure.

1. Given any two concepts, A and B, if it is inconsistent to suppose A without B, then B is a part of the meaning of A.
2. Given any two concepts, A and B, if it is not inconsistent to suppose A without B, then B is not a part of the meaning of A.

3. Given any two concepts, A and B, if it is inconsistent to suppose A without B, and inconsistent to suppose B without A, then A and B must be equivalent concepts in the sense that they have the same meaning.

4. Given any two concepts, A and B, if there is no inconsistency in supposing A without B and none in supposing B without A, then A and B must be logically distinct concepts, unrelated in meaning.

(Green, p. 18)

For example, in considering the concepts 'teaching' and 'intent to bring about learning', it appears inconceivable to use the term 'teaching' in a situation in which the actor is not intending that students learn. One might say, then, that 'intent to bring about learning' is a part of 'teaching'.

As an illustration of condition two, think of 'teaching' and 'learning'. It appears wholly conceivable to imagine one teaching and yet have no actual learning take place. Such is the case in bad teaching, often, but it is also possible with good teaching. Any number of factors beyond the teacher's actions can prevent the intended outcome from being achieved. 'Learning' is therefore not a
part of 'teaching', although the intent to bring about learning is.

One can extend the 'teaching' and 'learning' example to condition four. If one has shown a case of 'teaching' without 'learning', one has met the criterion in condition two. If one can also show a case of 'learning' without 'teaching', one has met both criteria for condition four, establishing the two as logically independent notions. For instance, one might imagine a child learning to form the letter "A" in the dirt in the backyard garden by repeated independent trials. No teacher need be present, no outside direction need be given. If the child succeeds in forming the letter, we would say that the child has learned how to form an "A".

To counter the claim that the child had been both teacher and learner, that is, had "taught herself", one might consult Scheffler (1960). In brief, a counter to the above claim is the absurdity of a failed attempt at self-teaching. Could one sensibly say, for instance, "I was teaching myself the Russian language, but I did not learn it"? As Scheffler points out, teaching is at least a triadic relationship involving a teacher, a pupil, and some content. 'Self-teaching' is a term
employed in ordinary language, but given the
triadic nature of 'teaching', it is perhaps more
accurate to say that one is attempting to "learn on
one's own". The latter allows more easily for
cases of failure without appearing contradictory.

Condition three involves concepts that require
one another. Take, for example, the notions
'bachelor' and 'unmarried adult male'. Part of the
meaning of 'bachelor' is 'unmarried adult male',
and similarly any case of 'an unmarried adult male'
implies 'bachelorhood'. The same might be said for
'teaching' and 'the intent to bring about learning'
or 'triangle' and 'three-sided plane figure'. The
above pairs meet the requirements set forth in
condition three and are thereby mutually necessary
for one another.

Throughout this discussion of the A-without-B
procedure, counterexamples were employed to test
the relationship of the terms at issue. Showing
that 'teaching' can be used without also including
in the case that students actually learn is to
employ a counterexample to the claim that
'teaching' implies 'learning'. The use of examples
that contradict an implicit or explicit
relationship is a valuable tool of analysis, and it
will run throughout this analysis (see the section in Chapter VI on the use of counterexamples to test descriptive/reportive definitions, for example).

**Borderline and Invented Cases**

In model and contrary cases, one is sure that the concept does or does not apply. In *borderline cases*, one examines situations in which there is some puzzlement as to whether the concept, here 'justice' and its related concept on the negative side, 'punishment', applies or does not apply.

Suppose a child touches an electric wire which he has been told is dangerous, and then gets a shock: is the shock 'punishment'? It has some features in common with model cases of punishment, but perhaps not enough: and we then look to see which is the important feature that is missing. Is it perhaps that there is no *person* who gives the punishment? (Wilson, 1963, p. 31)

Given the above, a new requirement not detected in the model or contrary cases is suggested. It would appear that a just punishment requires an authorized agent administering the punishment. The point is that through borderline cases one might

...elucidate the nature of the concept by continually facing ourselves with different cases which lie on the borderline of the concept: what we might
call odd or queer cases. By seeing what makes them odd or queer, we come to see why the true cases are not odd or queer, and hence what makes them true cases—what the central criteria of the concept really are. (Wilson, p. 31)

As an additional point, we often run into borderline cases of terms due to the term's vagueness. That is, one may be puzzled whether a particular individual is bald, rich, or skinny because the terms of description do not have precise bounds. While we have clear cases of each and clear cases in which the terms do not apply, there are also many over which we are puzzled. These borderline cases are not as helpful in analysis as is the odd or queer case, but they are perhaps the more frequently encountered.

At times it is useful to imagine invented cases, situations that fall outside ordinary experience.

The most important insights into human experience are often hidden from us by those simple regularities and conditions of our world that remain unnoticed because they are so taken for granted. Only when we are able and willing to imagine worlds very different from our own will we come to appreciate the significance of some simple facts about our own world. The importance of a thing is likely to become much clearer if we can imagine, in minutest detail, the features of a world in which it is absent. (Green, p. 211)
One might wish to imagine a world in which 'justice' is non-existent. What would we find? How would our lives be different? It is the use of invented cases that can perhaps best illustrate a key difference between the philosopher's art and the activities of natural and social scientists. "Philosophy need never wait on the development of science" (Green, p. 212).

Additional Concerns

There are a number of other concerns that often enter into the analytic process. The social context in which a concept is used or in which a conceptual question is asked is critical to any communication. Who asks the question about a term's use (or who uses the term at issue) and the purpose of the term's/question's employment goes a long way toward setting the bounds of a concept's use.

In line with social context is the concern for underlying anxiety, sometimes a motive for raising questions of concept; "certain features of life seem somehow to threaten the way in which we had always thought, and hence give us a feeling of
insecurity" (Wilson, 1963, p. 34). As Wilson points out, the meaning of questions regarding the possibility of people being responsible for their actions is affected by who asks the question—a defense attorney or a prosecutor (social context)—and under what psychological conditions the question is asked—a person fearing the loss of personal control versus a professor of jurisprudence engaging in detached intellectual investigation (underlying anxiety in the case of the former).

Finally, one must consider what practical results might accrue from answering the conceptual question in a particular fashion. What difference would it make to answer a question of concept one way or another? In a sense, this is a major concern in this study. What are the practical results of this analysis of 'teacher clarity' for teaching, for teacher education, and for research on teaching and on teacher education?

The results of the above example of analysis are at best sketchy, but the point is only to introduce the basic techniques of analysis. Since terms often are used ambiguously, arriving at the meaning is often impossible. What is generally
desired is to arrive at the most appropriate and useful employment of the term in question, considering the results in language of the various competing senses of the term.

...we have to pick the most useful criteria for the concept. Thus, when (but only when) we have analyzed the concept and noted the whole wealth of possible instances of it, we may often have to say at the end 'Amid all these possible meanings of the word so-and-so, it seems most sensible and useful to make it mean such-and-such: for in this way we shall be able to use the word to its fullest advantage'. (Wilson, 1963, p. 37)

It must be remembered that one does not engage in conceptual analysis in any cookbook fashion; merely stating model and contrary cases, followed by related cases utilizing the A-without-B procedure, and so on will not do. The cases and questions above represent an array of tools (and not necessarily a complete array) to be used as the conceptual situation warrants. Philosophical analysis is more an art or craft than a science; there is no prewritten formula for success.

Formula philosophy, like formula painting or music, is no good. It is artificial, strained, imperceptive, dull, usually irrelevant, and always unimportant. It would be absurd to attempt to perform an analysis simply by beginning with a model case and moving through the list to invented cases. These different kinds of
data are not equally relevant to every conceptual question. I know of no useful advice as to which should be used in relation to what particular question or when. There is no formula for philosophy; and there are no inviolable rules which, if followed, will guarantee success. It is an art, and like any art, its practice requires discrimination, judgment, and good taste. (Green, pp. 212-13)

One might parallel the doing of conceptual analysis (or the doing of science) with the employment of rules for operation. Scheffler (1960) makes a distinction between "exhaustive" and "inexhaustive" rules and their usefulness in teaching. The leap from teaching to other "practical arts" such as scientific research or philosophical analysis is a short one.

A set of rules is exhaustive if, when followed, they guarantee success (Scheffler, 1960, pp. 69-70). If, says Scheffler, we are faced with a child who wants to write 'cat' and we formulate rules such that the child is instructed first to form a "c", followed to the right without a space by an "a" and then a "t", we have an exhaustive set of rules for writing 'cat'. While the child may not actually follow the rules (failure is possible), if the rules are followed, success is guaranteed.
Other rules are inexhaustive. Scheffler's "lion hunting" example involves rules that cover "the details of training, preparation, and the conduct of the hunt" (1960, p. 70). One part of the rule system would include aiming and firing the gun when conditions are right. But even if the hunter follows the rules to the letter, other events might still intervene to produce a failure. The lion might move at just the right moment, thereby escaping the hunter.

One could easily make the set of rules exhaustive by adding "Kill the lion" as a final statement. But what has been gained? Following the rule, says Scheffler, guarantees success, but the problem is in following the rule. It appears that inexhaustive rules, while not guaranteeing success, nevertheless make success more likely and are therefore quite useful. Further, depending upon the task, to make inexhaustive rules exhaustive is not helpful. To tell one running a race to, among other things, be first to the tape or to tell students in a class to develop a proof in geometry that is composed of an ordered series of axioms and/or logically derivable statements that lead to the statement in question is to
provide an exhaustive set of rules, but again to be unhelpful (Scheffler, 1960, pp. 70-71).

Scheffler uses inexhaustive rules to characterize the guidelines and rules for teaching, but one can easily apply the same notions to the task of conceptual analysis. As an aside, we might find very useful the development of an inexhaustive set of rules for teaching clearly. It is likely that an exhaustive set that does not end with a statement similar to "Kill the lion" is not possible.

The Limits of Philosophical Analysis

When one thinks of the tasks of the philosopher, one often first imagines someone who is looking for the ultimate purpose or meaning of our existence, one who attempts "to provide a comprehensive and systematic view of reality, of the total workings of the universe, of our place therein, and of the meaning of life itself" (Soltis, p. 81). While many traditional philosophers have done this, and also have nested a philosophy of education within this broader framework (Plato, Dewey, e.g.), the goals of
analysis as a philosophic tool are not so grand.

This is not to argue for the narrower scope of
analysis over more all-encompassing
"philosophizing"; the two have different purposes.

Indeed, analysis and world-view
making may work in tandem. The
techniques of analysis may be used to
clarify and make more precise and
intelligible the broad and comprehensive
concepts of synoptic philosophical
systems. ...the techniques of analysis
can force abstract and vague ideas into
concrete and more meaningful contexts.
Utilizing such techniques, we may
sometimes find that a concept is empty or
merely honorific. ...Such a finding can
free us from literally senseless debates.
In the case of our analysis of the
concept of a discipline, for instance, we
might well have moved beyond the
time-consuming debates over the academic
status of education as a field of study
to direct our attention and energies to
the very heart of the matter: the
effectiveness of the field of study
itself, as determined by the soundness of
its various claims to knowledge and its
successes or failures in dealing with the
matters in its domain. (Soltis, p. 82)

In the words of Chambers (1983), philosophical
thinking involves two primary processes -
clarification and justification.

Philosophy is a special sort of
thinking; it is clarificatory. In
philosophy we are trying to become
clearer about concepts, about meanings
that escape our notice, about various
assumptions we may be making without
being aware of them, about principles and
points of view, about why a particular
principle or point of view is acceptable
or unacceptable, about reasons why, about arguments for and against a position. Taken together, these clarificatory activities help a person to construct an internally consistent and systematic world view that affects what he does.

It is sometimes said that the activity of philosophical thinking can be encapsulated in the two questions - What do you mean? and How do you know? - and the attempts of people to answer these questions. In short, philosophy is concerned with meaning and justification. (p. 1)

The focus of this study is on the employment of the clarificatory process, but justification cannot be ignored, as the two go hand in hand.

By employing analysis, then, one is able to spot conceptual problems in broader systems; one is able to get clear on conditions that are required for a term's appropriate use; and analysis can help one to develop a "conceptual map" of complex endeavors like teaching and learning (Soltis, p. 82). These uses of analysis complement rather than contradict the more traditional view of philosophy as "world-view making". It is also important to note that the employment of philosophical analysis in this study might serve as an example of how such analysis can play a role in theory construction and conceptualization of empirical research. Construct development and refinement may not be empirical,
but they are important parts of empirical research.

Beyond the development of a world-view, a "systematic view of reality", philosophers are also concerned with the value domain. How then does analysis apply to what is "good" or "right" with respect to education? The method of analysis involves holding back one's values; in this sense the method requires the adopting of a neutral posture with respect to that which is being studied. Just as a social or natural scientist employs the scientific method to produce results that are replicable by others who might hold different values, the analytic philosopher must operate according to the same replication criterion of good scholarship. Yet, Soltis claims that there is a problem, in that education involves values; complete "neutrality is neither desirable nor possible" (p. 83). It is the job of the normative philosopher to take stands on values in education and apply the knowledge of moral and ethical philosophy to the problem or issue at hand. But how does analysis illuminate the task of the normative philosopher?
Using the work of C.L. Stevenson, Soltis shows

...first, that the techniques of analysis can be used in the area of value considerations, and, second, that while these techniques may not solve the substantive problems of specific disagreements, they enable us to more clearly discern important features involved in many of the debates over educational values. (p. 85)

Stevenson distinguishes between "disagreements in belief" and "disagreements in attitude", two logically distinct while psychologically related notions, in an attempt to shed light on value choices in the curriculum. Since schools all claim to pass on knowledge, skills, attitudes, and values, things valued by society, what particular things of value are to be included as curricular components is an important question.

Stevenson’s claim is that disagreements in this value domain often occur at two levels: the "emotive or preferential domain of personal taste" (attitudinal) and the domain of "belief" (statements that are grounded in evidence). One might imagine a debate over dropping Latin from the college-bound student's curricular requirements, leading to a discussion between two teachers, one of whom (perhaps the teacher of Latin) with a strong interest in and love for Latin, and another with memories of disdain for conjugating
verbs and translating Virgil (Soltis, pp. 85-86). The argument over the relative drudgery or excitement of Latin is one best seen as a disagreement over attitude or preference. As such, the debate is meaningless and probably unresolvable, since attitude/preference claims merely tell us how one feels about the topic of interest.

At some point, the debate might proceed to the offering of reasons for valuing Latin. The Latin teacher might claim increases in English vocabulary for students of Latin, and the opposing teacher might cite relevant counterexamples. At this point, says Soltis, the argument can go a number of directions. The point is, however, that there is some hope for meaningful resolution when the debate proceeds to beliefs that are grounded, warranted. This contrast between ungrounded attitude (preference) and grounded belief (value) claims is critical.

In short - and this is Stevenson's point with respect to a psychological (and not a necessary and logical) connection between attitudes and beliefs - a change in belief may have sufficient psychological force also to bring about a change in attitude, but such is not necessarily always the case. While this makes it clear that we may fail to settle a disagreement over values no matter what evidence we offer for our position, what seems most important here is the realization that there is a very pertinent relationship between the truth and falsity of one's
beliefs and the value positions one adopts. Stevenson's analysis of disagreements thus provides us with a fuller and clearer picture of the nature of disagreements over values. Although it may not provide a surefire way to resolve questions of value, it does throw needed light on some important components of educational debates over values. (Soltis, p. 87)

The offering of reasons for one's positions brings up another important point - the role of both additional facts relevant to the situation and conceptual clarification. While simply appealing to facts or to concepts is insufficient for resolution of ethical conflicts, often more facts and/or conceptual clarity are helpful.

Very often when one is puzzled about what he or someone else should do in a certain situation, what one needs is not really ethical instruction, but simply either more factual knowledge or greater conceptual clarity. Certainly, a large part of the debate about what to do about drugs, pollution, or war arises because we are ignorant of much of what bears on these problems. On these issues and on many others, most of us would probably be clear about what should be done if only we knew all of the relevant facts. Again, in the field of education, much of our difficulty about decisions of policy is due to unclarity about what intelligence is, what liberty is, and so on. I stress these points because I think that moral philosophers cannot insist too much on the importance of factual knowledge and conceptual clarity for the solution of moral and social problems. The two besetting sins in our prevailing habits of ethical thinking are our ready acquiescence in unclarity and our complacence in ignorance. (Frankena, 1973, p. 13)
As an illustration, the Latin teacher's claim that Latin is useful in increasing English vocabulary is a factual claim. Its truth or falsity could go a long way toward resolving the dispute. Similarly, gaining conceptual clarity over what is 'good' or 'liberal' education may be equally helpful.

It should be clear that the neutrality of the method of analysis (like that of the scientific method) does not preclude its use in the value domain, even though ultimate resolution of the value clashes is not guaranteed by engaging in the process. Further, one need not be a philosophical analyst to use the results of analysis. Soltis applied Stevenson's analysis to an educational issue without actually engaging in analysis (Soltis, p.87).

Soltis goes on to say that the "impatience" of the philosopher for "fuzzy thinking and vague
ideas" could be the most important philosophic contribution to education if practicing educators were to "catch it" somehow.

To be told that students should learn by discovery or that one should teach the "structure" of the subject is not to get answers to the practical questions of how and what to teach. Rather, such directives provide a context for asking some important prior questions that will give practical meaning to these ideas. Discovery of what? Anything? Everything? What is discovery and how does the learning by discovery differ from other kinds of learning? What is the structure of a subject? What criteria must be met by an element of a subject for it to count as part of the structure of that subject? (Soltis, p. 88)

The promise of philosophical analysis as applied to teaching and learning is the achieving of a critical attitude in the most positive sense of that term. This critical attitude or perspective will enable educators to "think through" carefully and precisely what is being offered by text publishers, school board members, theorists, and researchers prior to its being implemented (or discarded) by the schools.
Given the methodological overview and the limits of the method, it is important to lay out how the method is employed in this synthesis of research. The first conceptual question to be handled is: What is 'clear teaching'? The notion of 'clear teaching' (or 'teacher clarity') is addressed via model and contrary cases, first, followed by borderline cases, related concepts (using the "A-without-B procedure") and other pertinent components of the analytic method, as they become useful.

Having begun the "mapping of the conceptual terrain", the work is extended to other philosophical analysis done on related concepts, such as 'explanation'. Distinctions between logical aspects of clarity and psychological aspects of clarity (as perceived by students) will become apparent, and will fall in line with similar distinctions in the analysis of 'explanation'.

Having shown the relationship between student perception of clarity and the giving of "satisfactory explanations" (as opposed to
logically complete explanations), a philosophical basis will have been developed for the operational, low-inference descriptors of teacher clarity arrayed on the Ohio State University teacher clarity instrument.

The second half of the analytic endeavor is composed of parallel analysis of 'inhibitors to teacher clarity'. The conceptual framework is directly opposite that for 'teacher clarity' (model cases become contrary cases and vice versa). Again, following the development of a conceptual map, and the comparison of that map to the barriers to satisfactory explanations, all the indicators discussed by Land, Smith, et al., as inhibitors to clarity will be assessed with respect to adequacy and justifiability of the "inhibitors to clarity" label.

Having briefly summarized the method, analysis begins in Chapter IV with the operationalized versions of 'teacher clarity' being compared to the term conceptually, as derived from philosophical analysis. Chapters V and VI extend the work on clarity via analysis of related concepts, 'explanation' in particular. The rationale for this focus on 'explanation' is found in Chapter IV.
Chapter VII employs the same procedures in parallel fashion relative to 'inhibitors to clarity', operationally defined and as found in ordinary language. Chapter VIII summarizes the results of the analysis and allows time for discussion of significant extensions of the study for research in the areas of teacher clarity specifically and teacher effectiveness in general. Applications and misapplications to practice are also addressed.
CHAPTER FOUR

'TEACHER CLARITY': INITIAL ANALYSIS

To this point the problem has been stated, background literature reviewed and summarized, and methodology described. The next four chapters explore 'teacher clarity' from a number of differing perspectives. Chapter IV begins with an indepth look at the definition of 'clarity' that comes from the empirical work reviewed in Chapter II. While this is helpful, a number of difficulties are examined and an initial pass at explicating 'clarity' via conceptual analysis is presented. Chapters V and VI add to the analysis by applying other philosophical work on 'pedagogical explanation', a term found to be closely related to 'clear teaching'. Chapter VII rounds out the picture by pulling in the inhibitors to clear teaching, beginning with the empirical research in Chapter II and then applying material from Chapters IV through VI.
The questions addressed in this chapter are as follows: What is the operational definition of ‘teacher clarity’? Are all the items listed necessary for high clarity scores? Put differently, do all need to be present for every case? Do any need to be present? Do all of the intermediate levels (factors) need to be present? Given the empirical work done on teacher clarity, how does one distinguish clear from unclear teaching?

As was discussed in Chapter II, ‘teacher clarity’ as a high-inference concept ...was viewed as a state in which a teacher who is in command of the subject matter to be transmitted is able to do that which is required to communicate with learners successfully. Following presentation, most learners react by easily interpreting the verbal or visual materials organized and presented by the teacher. Further, it was assumed that clarity of presentation can be perceived by learners and that learners are able to provide raw descriptions of clear teaching. Finally, teacher clarity was assumed to be a measurable construct at several meaningful levels of abstraction. (Hines et al., p.88)

Teacher clarity as a low-inference concept, derived from the work of Cruickshank et al., Bush et al., and Kennedy et al., has been defined by Hines (1981) and by Hines et al. (1985) as an array
of eighteen individual items rated on a five-point scale. A brief history of the work leading to the Hines instrument is provided, followed by the Hines operational definition, with emphasis on clarifying and elaborating on the rating of teacher performance using the Hines instrument.

Clarity Defined Operationally

The first step in the process of identifying the specific referents for ‘teacher clarity’ is the Cruickshank et al. (1975) study in which the researchers asked 1009 junior high and middle school students what behaviors were performed by clear teachers. This process yielded 110 statements of clear teacher behaviors grouped in thirteen categories, found in Appendix A. It is noted that Categories J and L are sometimes combined, as in Cruickshank and Kennedy (p. 21), yielding twelve categories.

The next step in the process is the Bush et al. (1977) study, designed to provide operational descriptions of clarity by identifying low-inference constituents and to determine whether these behaviors could discriminate between clear
and unclear teachers. The Kennedy et al. (1978) study replicated, refined, and extended many of the features and findings of the Bush et al. study. The results of these two studies indicate a list of twenty-eight "prime discriminators", defined operationally "as behaviors that demonstrated a correlation with discriminant function scores (i.e., a structure coefficient) of .71 or higher" (Kennedy et al., p. 5). They are listed in Appendix B. It should be noted that items thirteen and twenty-seven are identical, leaving the total number of prime discriminators at twenty-eight and not twenty-nine.

The items in Cruickshank et al. (1975) marked with an asterisk became prime discriminators in the Bush/Kennedy work. All others fell out of use. There are no exact predecessors of prime discriminators number 3, 11, 22, and 28, due to instrument revision in the Kennedy et al. replication. They are either combinations of items or additions "to fill gaps in content coverage and to augment several sketchy behavioral patterns" (Kennedy et al., p. 4).

Hines (1981) examined relations among high- and low-inference measures of clarity and assessed
relationships between clarity measures and student achievement and satisfaction. Her study, done at the college level, resulted in forty-three prime discriminators of clarity that were refined and reduced to twenty-five low-inference behaviors. These items, coupled with intermediate, factor-level items and high-inference items make up the Clarity Observation Instrument (COI), found in Appendix C. There is a great deal of overlap between Hines and the earlier clarity work of Bush et al. and Kennedy et al., but there are some significant differences, discussed below.

The definition of clarity having the greatest impact on present research efforts (see Williams, 1983, and Gloekner, 1983, e.g.) is the Hines COI. Because of its popularity, because the Bush/Kennedy array is not ordinarily employed as a rating instrument, and also because of suspected problems with the Hines array, the COI will be the initial point of analysis in this study. In this analysis of the COI, changes in item listing from the Bush/Kennedy work is prominent.

The concept of teacher clarity is defined by Hines as eighteen observable, countable low-inference behaviors, followed by seven more
items that are rated rather than counted, four intermediate categories (factors from the Hines, 1981 study), and three high-inference items (clarity, organization, and opportunity to learn criterion material). The whole array is found on the clarity instrument in Appendix C. Since Hines was also interested in organization and student opportunity to learn criterion material as correlates of clarity, and since these items are not of interest here, items twenty-five, thirty-one, and thirty-two ought to be ignored. The explanation of all relevant items comes directly from training materials (and discussion) developed and utilized by Hines (1981) and Williams (1983). The eighteen low-inference behaviors follow.

1. **Points out what is important for students to learn.**

   The teacher deliberately draws students' attention to those aspects of the content of instruction it is important for them to learn. The teacher might say, for example, "It is important for you to know this..."; "You must understand this..."; "It is very important for you to
learn..."; etc. This behavior may be initiated by the teacher or it may occur in response to a student question or comment. The key here is first-time emphasis of content; repeating points thereafter is categorized under a different heading.

2. **Repeats things that are important.**

   The teacher during the lesson presentation repeats (for emphasis) a specific aspect of the content of instruction (e.g., point, idea, rule, etc.). This behavior may be initiated by the teacher or it may occur while he/she is elaborating on some statement/comment made by a student or during the review process. It does not, however, occur as a direct response to a student question or comment indicating that he/she does not understand something that has been said (taught). A classification of "Repeating things that are important" can be the result of the repetition of content from number one above.

3. ** Writes important things on the board (chart).**

   The teacher writes on the chalkboard (chart, slides, etc.) important words, phrases, rules, concepts, ideas, etc. related to the content of instruction. The teacher may initiate this
behavior, or it may occur in response to a student's question or comment. Handouts prepared for the class may also count in this category.

4. **Summarizes the material presented in class.**

   The teacher, on completion of the lesson presentation, gives a summary of the instructional content presented in the lesson. The initiation of the summary is not a result of student questions. It is a concise, one-time overview of lesson content (all content).

5. **Explains things (aspects of content).**

   The teacher explains specific aspects of content. This behavior is usually initiated by the teacher or it may occur in response to a student question or comment, to further illuminate an aspect of the content of instruction not previously explained.

   The material in this category must be totally new. Further, one explanation can be interrupted or split by other behaviors (numbers one and two above, e.g.).

6. **Uses examples when explaining.**

   The teacher uses verbal or written practical examples when explaining some aspect of the content of instruction. For example, the teacher may work
examples of problems on the chalkboard to help
explain to students how to do specific computations
or solve problems or may use practical examples to
demonstrate (explain) certain techniques. This
behavior may be initiated by the teacher, or it may
occur in response to a student’s question or
comment. It is always content-specific and can be
either explicit or implicit.

7. **Explains what unfamiliar words mean.**

The teacher tells students the meaning of a
word/words with which students are unfamiliar.
This behavior may be initiated by the teacher or it
may be in response to a student’s question or
comment.

8. **Explains something and then stops so that students can think about it.**

The teacher explains some aspects of the
content of instruction and then deliberately pauses
to provide time for students to think about what
has been said. The teacher, after the explanation,
explicitly (or implicitly) tells the students that
he/she is providing them some time to think about
what was said. The teacher may initiate this
behavior or it may occur in response to a student’s
question or comment. No questions are solicited by
the teacher in this category; the intent is to allow the material to "sink in".

9. **Shows similarities and differences between things.**

   The teacher describes, explains, or shows how two or more things (e.g., ideas, concepts, objects, ways of doing things, etc.) are alike and/or how they differ. This behavior may be initiated by the teacher or it may occur in response to a student's question or comment. Teaching behaviors in this category do not count as number two above or sixteen below unless said again beyond the similarity/difference.

10. **Shows students how to remember things.**

    The teacher shows students (e.g., by the use of some memory trick, making reference to something familiar to students, etc.) how to remember some specific aspect of content. This behavior may be initiated by the teacher, or it may occur in response to a student's question or comment.

11. **Reviews what has already been studied (taught).**

    The teacher reviews (goes over) specific aspects of content previously taught to ensure that students understand and remember those aspects of
content. During the review, the teacher may ask questions about the content or synthesize certain aspects of content before proceeding to the next step in the lesson (or before ending the lesson). It is therefore possible for the review process to involve other specific behaviors on this list.

12. **Asks questions to find out if students understand.**

   The teacher, after explaining, repeating, reviewing, some aspect(s) of the content of instruction, asks a direct question (e.g., "Do you understand?", "Do you have any questions?", "Is that O.K.?", or asks questions about the content taught), to find out if students understand what has been said (taught). The teacher may initiate this behavior or it may occur in response to a student's question or comment or some non-verbal cue from students indicating that they do not understand. (Note that this may point to the key in the difficulty with the use of "O.K." mentioned in Chapter II.)

13. **Has individual students work publicly.**

   The teacher asks individual students to work at the chalkboard or aloud, while other students pay attention to what is being said or done. The
intent is to assess student understanding and to force a demonstration of that understanding.

14. **Examines students' work privately.**

The teacher checks an individual student's written or practical work at the student's or teacher's desk, or some designated private area in the classroom. The intent, as in thirteen, is to assess student understanding and to force a demonstration of that understanding.

15. **Allows time (pauses) for students to ask questions.**

The teacher after explaining, repeating, reviewing some aspects of content or responding to a student's question or comment, deliberately pauses and provides time for students to ask questions about the content of instruction. The teacher may directly solicit questions from students, or may pause for a while and give some non-verbal cue to students indicating that they are invited to ask questions. Time is the key (a pause) difference between fifteen and twelve above. The teacher asking "Would you like to look over your notes to see if you have questions of clarification?" would be an example of fifteen.
16. **Repeats things when students do not understand.**

The teacher repeats aspects of the content of instruction (previously addressed) which students directly or indirectly communicate to the teacher that they do not understand. If a particular example has already been given, and it is repeated, it is an example of sixteen and not six. Sixteen may occur with seventeen below if the answer is elaborated upon.

17. **Answers students' questions.**

The teacher answers content-related questions asked by student(s). All that is required here is simply answering the student’s question without elaboration.

18. **Provides time for students to practice (e.g., work problems).**

The teacher, during the class period, provides specific time for students to do written or practical assignments related to the content of instruction. This may take the form of individual seatwork or group work. The teacher may play an active (leading) role in the case of group work. The intent here is assimilation and synthesis of content. The time is set aside so that students
can bring things together via practice. This can occur along with a number of the above behaviors.

**Organization at Higher Levels**

Hines proposed two higher levels of inference as part of the clarity construct. Items nineteen through twenty-five are classified somewhat awkwardly as "lower inference behaviors". This is a bit misleading in that the term is ambiguous; one might ask, "Lower than what?". The answer is, lower than the factor level intermediate behaviors to follow (items twenty-six through twenty-nine), but higher than the low-inference indicators explicated above, according to Hines. In actuality, they are low-inference behaviors generated in similar fashion to the first eighteen. The difference is the ability of outside observers to evaluate items nineteen through twenty-five and not the level of inference at which raters must operate.

Items twenty-six through twenty-nine are the intermediate level behaviors that represent the factor labels from Hines's statistical analysis, and they are grouped accordingly on the instrument. Item number eighteen fit no factor neatly; it was a
factor in and of itself.

Finally, item thirty is the high-inference construct. Note that the choices on the Hines scale move from "clear" to "vague", a point to be discussed later in this analysis. In brief, it will be shown to be conceptually inaccurate to view 'clarity' and 'vagueness' as polar opposites.

As stated earlier, this array of items comes in part out of the Bush et al. and Kennedy et al. work that generated twenty-eight "prime discriminators" of teacher clarity. Hines (1981) replicated the item generation phase of the study with college students and found a total of forty-three prime discriminators. A detailed account of her work in refining the instrument is found in Appendix F of her (1981) study.

Behavioral statements from this pool of low-inference teacher clarity behaviors were selected for inclusion in the observation instrument based on the following two criteria: (1) the extent to which the given teacher behavior was directly observable by external observers; and (2) the appropriateness of the given behavior to the particular teaching context for the study. (Hines, p. 393)

Three statements were eliminated from the list by failing to meet criterion (1). They are: gives explanations students understand; teaches at a pace
appropriate to the topic and to students; and stays with the topic until students understand. These are questions to be answered by the students being taught, according to Hines (p. 393), and not by third-party observers.

Some statements were seen as subsumed by or as composites of others, thereby altering the list further. Six others were eliminated by failure to meet criterion (2). They are: compares new material to what students have already learned; explains assignments and the materials students need to use; prepares students for what they will be doing next; reviews work before a test; distributes time adequately over the topics covered during the course; and tells students what their responsibilities are with respect to the course (pp.393 and 396).

Of the eliminated items, at least seven were listed in the Kennedy et al. (1976) results as "prime discriminators": teaches at a pace appropriate to the topic and to us; describes the work to be done and how to do it; asks if we know what to do and how to do it; prepares us for what we will be doing next; stays with the topic until we understand; shows us how to do the work; and
explains the assignment and the materials we need to use to do it. To the extent that these eliminated items are a part of what clear teachers do, it would appear that the Hines instrument further delimits 'clarity' to observable items relevant to isolated, single-episode teaching. Put differently, if a concept is comprised of items that do not meet the criterion of observability, eliminating those items creates a new, more restricted concept. 'Teacher clarity' using all prime discriminators is different from 'teacher clarity' using the more restricted list.

Beyond observability, the second criterion seems to adapt the list of prime discriminators to the research context employed, to the use of a single-episode teaching simulation to generate data for analysis. By removing those items that require placing the teaching episode in a realistic context, a context that involves lessons preceding and following the episode being studied, a context that ties the lesson to long-range goals and testing, and so on, one removes critical information. It is just such a context that one hopes to impact by applying knowledge gained through the above research. If the research
eliminates this context, ecological validity must be questioned seriously.

It might be added here that the array of prime discriminators generated by Bush et al. and Kennedy et al. is not limited in these ways. It appears advisable that this be considered in research employing the clarity construct.

The issue of altering a concept for the purposes of research (in this case, further operationalizing an operational concept) and then using the same term in ordinary discourse will be addressed later. Suffice it to say here that the Hines instrument uses a narrower set of items than was generated by the earlier research. This paring of the list of prime discriminators was due in part to a needed refinement of the twenty-eight prime discriminators of the Bush et al. and Kennedy et al. study and the forty-three of the Hines replication. But some of the items were eliminated due not to refinement so much as to convenience and appropriateness to the chosen research methodology and data generation process. This could lead to faulty use of the instrument in a real classroom setting, where one lesson does lead to another, and where not all is observable by third parties.
The next section deals with the Hines instrument as it stands. Specifically, the role of the items in terms of necessary and sufficient conditions for 'clarity' is explored. The basis for this exploration is the training given to raters by two primary users of the instrument, Constance Hines and E. Jane Williams. The same analysis is then extended to the Bush/Kennedy list of prime discriminators.

The Definitional Role of the Items

It is obvious that the behaviors are not to be taken as individually necessary for clear teaching. No single behavior on the low-inference level is necessary for a high clarity score. To get the highest clarity rating, each factor (numbers twenty-six through twenty-nine) must be addressed adequately, however. A problem arises here in that no real guidelines are set (or can be set?) in terms of cut-off points in the training process for raters. The low-inference results are used along with the "lower-inference" responses in determining intermediate-level ratings, and those are used for the high-inference rating of overall clarity. Beyond the low-inference behaviors, judgment of
quality is critical to the final assessment.

On inspection of the items and drawing from the experience of training and use of the instrument to evaluate teaching, it does appear that some low-inference items carry greater weight individually than others (eighteen over seven, e.g.). Perhaps a weighting system would help draw the low-inference total closer to a quantifiable high-inference score. At present there appears no way around the judgment issue, though. Even with the need for judgment on the part of raters in the move from low- to intermediate- to high-inference levels, however, there is remarkably high statistical agreement between the levels (Hines, 1981). This issue of judgment will be addressed again later; it may be an inescapable part of assessing clear teaching.

Since the mere existence or non-existence of a low-inference behavior is neither necessary nor, it would appear, sufficient, for the determination of clear versus unclear teaching, and since relying on the intermediate levels, while helpful and necessary to some extent is similarly inconclusive, the level of quality required is not easily determined, at least for the highest clarity
rating. Put differently, clear teachers do seem to stress important aspects of content, explain content, provide for student assimilation and synthesis of content, assess and ensure student understanding, and provide for student practice, but the possibility remains for an unclear teacher to do all of the above, also, albeit less effectively. The difference is likely to be quality as well as frequency of performance.

While some rough notions of frequency fall out of the training process for raters, the ultimate clarity rating seems based more on quality of performance on the factor (intermediate-inference) level. Technically, then, countability is not the primary gauge of clarity ratings; quality is. One might even ask whether a true operational definition has been developed for the high-inference clarity construct. While no direct reference to this problem is found in the research, it was an issue recognized and discussed in rater training sessions run by Hines and by Williams.

In addition, there appear to be at least two ways to look at this array of behaviors labeled the Clarity Observation Instrument (COI). First, it might be the case that the eighteen low-inference
behaviors do make up the behaviors performed most by clear teachers and, grouped appropriately, make up the intermediate level behaviors (factors).

A second possibility exists, however. It could be that clear teachers tend to perform the factor level behaviors (categories) better and/or more frequently than do unclear teachers; and the low-inference behaviors are merely examples of the factor level categories. In this case, there would be no magic to the first seventeen (number eighteen was also a factor in and of itself). The five intermediate groupings and number eighteen would really make up the variables of interest. One might end up with an array of general teacher behaviors much like the one proposed by Rosenshine (1983, pp.336-337) and labeled "direct instruction". It is recognized here, however, that the "direct instruction" behaviors did not come from any study of the construct itself, while the clarity list did fall out of an explicit study of 'clarity'.

It is not uncommon that coming up with a precise definition of a concept is not possible. Some concepts appear to be "loose", to use Ennis's words (p.223). In his example, 'scientific method'
is often defined as a five-step process involving stating the problem, generating hypotheses, experimenting to test the hypotheses, drawing tentative conclusions, and testing the conclusions in practice. Yet much of what is accepted as science does not follow this method, at least not rigidly. For instance, the existence of planets, solar systems, black holes, and the like have been determined without controlled experiments. Yet the astronomers are still rightly seen as practicing science.

The point is that strict equivalence is not required. An attempt to force the concept into a strict classification or equivalence-type definition would lead to problems of inclusivity (too broad a definition), exclusivity (too narrow a definition), or both. 'Teacher clarity' seems to be similar to 'scientific method' in this sense—they are both "loose terms".

The attempt to define 'clarity' as only those behaviors on the Hines instrument would be a mistake in that the set is too exclusive. That this is a possibility is indicated at least by the pruning of the twenty-eight prime discriminators of clarity from the work preceding Hines. In
addition, there may be items included in the Hines array and/or the Bush/Kennedy array that go beyond 'clarity', thereby being too inclusive as well.

Some terms are what Ennis calls "range terms", because "their boundaries are like those of a mountain range, imprecise but, loosely speaking, there" (p.223). Building precision into a term when the term is not precise yields a different concept. Such is the case with operational definitions (used in research) of ordinary language concepts. There need be no damage done as long as the separation between the research context and ordinary use is maintained. But if the caveats of research are lost, then equivocation between operational and ordinary uses is a possibility.

The notion of "range definition" employed by Ennis "consists of a set of criteria, none of which can be expected to hold for any given application of the term" (p.223). Such is the case for the definition of 'scientific method', claims Ennis (borrowing from Max Black). I would claim that such may also be the case for defining 'teacher clarity'.

The major advantage of such a definition is that it retains the imprecision of many of our concepts and
thus fits them better. The weakness is the other side of the coin. Such definitions are not self-applying. Human judgment, based on a thorough knowledge of the field and the situation, is necessary. (Ennis, p. 224)

It makes no sense to speak in strict terms of either necessary or necessary and sufficient conditions for 'teacher clarity'. The features deemed important are present in greater or lesser degrees, the extent of which determines whether the "clear teaching" label applies. Put differently, we can speak of having sufficient conditions present in a teaching episode to declare that the teacher is clear, but we cannot specify ahead of time a list of necessary or necessary and sufficient conditions for clear teaching.

A general class or category of behaviors can be posited and considered a necessary condition (e.g., 'clear teaching' need be a case of 'teaching' generally construed). Yet within this general classification, there is a great deal of variability. The work of Munson on ordinary versus technical terms may help make this point.

Parallelizing Ennis, Munson (1976) points out that words used in everyday speech seldom are governed by a set of necessary conditions (p. 44).
That is, we have a number of instances or sets of conditions for which we might use the word 'book' (printed, bound, published text; handwritten, unpublished parchment sheets, tied together with rope; and so on), none of which must be present in all cases. Rather, we typically use a word like 'book' in reference to a set of sufficient conditions (e.g., if something is printed on paper, bound, and published, then 'book' applies).

The notion of 'sufficient conditions' can be misleading, also. Seldom do we have a single set of sufficient conditions for use of a term. In the case of 'book', any number of characteristics in combination might apply. When we speak of sufficient conditions for use, we mean, ordinarily, that enough of those traits or characteristics are present to justify the use of the term in question. If A, B, C, D, E, F, and G all apply to term 'x', using 'x' might be appropriate if any three are present (A, B, and D; C, E, and F; and so on).

Words, then, are typically connected with properties in the way that a presidential candidate is connected with registered voters. If a sufficient number of people vote for him, then he wins. But no one certain person has to vote for him, and some of those registered may not vote at all. If a sufficient number don't vote for him, he loses. But that doesn't mean that nobody voted for him. (Munson, p. 47)
Some set may be sufficient, but no set in particular need be present.

As a second example, one might consider what would count as a healthy diet. Some notion of balance among the major food groups is likely to be a part of such a diet, with minimum levels of each group suggested along with overall caloric count, vitamin supplements perhaps, and so on. It is unlikely that a specific listing of foods would be given to be followed rigidly, with some being labeled absolutely necessary for good nutrition. It is similarly unlikely that one and only one specific list would be proposed as sufficient. Yet a number of different combinations and proportions could suffice.

The above is not the case with technical terms. Some terms, like 'hypotenuse', 'right angle', or 'parallelogram' do have necessary and sufficient conditions governing their use. Often these words are defined in a scientific or stipulated manner and function within the bounds of a narrowly prescribed theory. The adequacy of the definition is judged in terms of how the definition functions within that theory.
'Clear teaching', it would appear, is technical in the sense that it is being operationalized to function within a particular line of research, but it is difficult to make neat distinctions between theoretical/operational and ordinary uses. It is a term that has meaning in ordinary language as well as in science, and the two are hard to separate.

The Hines operational definition of 'clarity' as it is employed by raters seems to be very close to Munson's description of ordinary terms and Ennis's use of "range terms". No single behavior is necessary, but some set of behaviors from the low-inference list (or from the factors) must be present in sufficient quantity and quality to justify the use of the term. As such, the use of 'clarity' more closely resembles a term in ordinary language or a range term than it does a technical term. The same could be said of the Bush/Kennedy list of prime discriminators. It is difficult to be certain on this point, as this array was never used as an evaluative instrument.

While one could simply say that 'clarity' is here to be understood as the array of behaviors on the Hines instrument, little would be gained by
such question-begging. We would run into problems similar to those related to 'intelligence' being that which intelligence tests measure.

When 'clarity' is construed generally as teachers doing what is necessary "to communicate with learners successfully" (Hines et al., p.88), one runs the risk of additional circularity. The task of the research on clear teaching ultimately is determining the relationship between teacher clarity and student outcomes, achievement being one such outcome. It would appear that achievement is used as a part of the global conception of 'clarity' from the start. The move to specific behaviors that make up this high-inference notion helps a bit, but the tautology is evident and troublesome.

An improvement in the low-inference definition is gained by reintroducing the items eliminated by Hines but found on the Bush/Kennedy list of prime discriminators. Including behaviors that, while not directly observable by third-party raters, do give information relative to the teacher's ability to address student subjective needs, is an important part of clear teaching according to this earlier research. This point is borne out by work
on "satisfying explanations" found in Chapters V and VI here, also. Further, including items that are not relevant to laboratory, single-episode teaching but are related to teaching in a naturalistic setting adds much to the usefulness of the instrument in the field.

The discussion above regarding necessary and sufficient conditions coupled with the insights of Ennis regarding "range terms" and Munson on ordinary language terms versus technical terms fits independent of the adding of these items. But the usefulness of the resulting instrument in terms of ecological validity is enhanced by the inclusion of the Bush/Kennedy items left out by Hines. While testing the Hines instrument in the field might be useful in some ways, it is suggested here that, due especially to the elimination of items dealing with lesson-to-lesson continuity and integration, all of the original twenty-eight prime discriminators be included in some fashion.

Including items that assess the logical quality of the presentation would enhance the operational definition in terms of its independence from the desired outcomes (especially student achievement). It may become necessary, in other
words, to move beyond "student perceived" clarity to a notion that is at least in part defined independently of the outcome desired. But we are moving too quickly here. More needs to be said about 'clarity', especially concerning logical versus psychological aspects of clear presentations discussed in detail below and in chapters that follow.

Since testing the clarity operational definition for necessary/sufficient conditions appears to be a dead end, and since 'teacher clarity' has some definitional characteristics of ordinary as opposed to technical terms, one must proceed in a different direction. The next section looks at 'clear teaching' from the perspective of ordinary cases illustrative of the concepts at issue.

**How Do We Use 'Clear Teaching'?**

It must be noted again that in the empirical research 'clear teaching' is not spoken of in all its forms, everywhere it is found. One is not talking, for example, about a teacher's audibility, while audibility may be involved. The notion of 'clear teaching' is limited to students perceiving
the material presented as having been clearly rendered. The image employed might be labeled the "saran wrap" metaphor. Rather than the teacher employing a vehicle of transmission that wraps the content in foil for delivery, the teacher uses transparent plastic. The students can "see" what they are getting.

The notion of "seeing" what is being presented is illustrative of another facet of 'clear teaching' that is different from 'teaching' more generally conceived. 'Teaching' can be used in the task sense or in the achievement sense, as process or as product (see Smith, 1961; Ryle, 1949; Scheffler, 1960). Further, in the task sense of teaching, results are not certain. One can succeed or fail.

'Clear teaching' is used in the product or achievement sense only. One can be teaching clearly only if certain results obtain. It is true that one can strive to teach clearly and fail. Yet, we might draw a parallel here with 'selling' (Smith, 1961). Just as one can try to sell cars, one must sell and another must buy if an individual is said to be selling cars. The same is the case with 'clear teaching'. A particular outcome is
necessary, thereby drawing a distinction between 'clear teaching' (and 'selling') and 'teaching'.

An ambiguity rears its head here, however. The product sense of 'clear teaching' can be conceived in at least two ways. The teacher can be teaching clearly in a psychological sense. This psychological, or student perceived, clarity (the sense at the heart of the clarity research reviewed in Chapter II) is achieved if and when students "see" the teacher's point. Once they understand in some sense the teacher's point, clarity is achieved.

A second product sense is possible, however, having to do with teaching clearly in a logical sense. That is, the rendering of the material is organized logically and is an accurate, correct account of the subject at issue.

The logical achievement of clarity is neither necessary nor sufficient for the student perceived sense. That is, one can imagine a teacher being quite clear in a logical sense about a topic (e.g., nuclear physics), but not being perceived as such by students. Similarly, a teacher can be quite unclear in the logical rendering of a topic (e.g., be muddled and/or wrong), and yet be perceived as
being clear. This latter possibility is especially likely when difficult material is diluted such that the content is distorted but, in its distorted form, is made intelligible to students who are incapable of understanding at the deeper (and more accurate) level.

Another way to look at the above is that the logical product sense of 'teaching', taken from the student's perspective (or that of a third party), is an offshoot of the process sense of 'teaching' broadly conceived. It becomes a product sense of 'clear teaching' from the student's perspective once the student "sees"; but it need not happen. Perhaps a fuller notion of 'clear teaching' can be developed if both product senses are employed in the definition. The notions of logical (or "semantic", to use Martin's terms) as opposed to psychological (or "pragmatic") clarity is an important conceptual distinction here.

Cases of Clear Versus Unclear Teaching

Any case of teaching involves a teacher engaging a pupil or pupils in some content, with the intent to produce learning (Smith, 1961;
It would appear that elements of 'clarity' might enter and/or be lacking in any of these areas. Put differently, the source of the lack of clarity might be with the teacher, the pupil, the content, or the intent of the teacher (in his/her own mind or in the mind of the pupil), or some combination of the four. From the perspective of clear teaching, perhaps all four need to be addressed to some minimal degree before the teaching is seen as clear.

Imagine the following scene:

Ms. Jones sits at her desk, awaiting her first period class. She is reputed to be knowledgeable in her subject matter; other math teachers seek her out on problems of geometric principle and pedagogic technique. Her skill in communicating with students is well-known, as well. She even makes geometry interesting and understandable.

The bell rings as the last few students take their seats. It is only 8:15, but the students are alert and waiting. She begins with a review of the previous day's work.

"Yesterday we ended class discussing right angle triangles. What did we learn?"

"One angle is 90 degrees."
"Right, what else?"

"The other two angles add to 90 degrees."

"Yes, what about the sides?"

"One is longer than the other two."

"Yes, what is the longest side called?"

"The hypotenuse."

"No..."

"The hypotenuse."

"Yes. Now we are going to discuss the relationship between the hypotenuse and the other two sides. The hypotenuse of a right triangle can be computed if you know the length of the other two sides. The formula is on the board. Can anyone explain it?"

"'A' squared plus 'b' squared equals 'c' squared."

"Right, now what does that mean?"

Pause...

Ms. Jones begins again, "Well, which one is the hypotenuse, if it is supposed to be the longest side?".

"'C' squared, no, 'c'."

"Yes, now how does 'c' relate to 'a' and 'b'?"

"Well, if you square 'a' and 'b' and then you add them together, you get 'c' squared."
"So how do you find \( c \), the hypotenuse?"

"Take the square root."

"Right, now let's work a few problems."

Examples follow, with students working at the board and at their seats. When errors are made, the class works together to correct them.

Extraneous activity is rare in Ms. Jones's class; students seem to know what to do and they stay "on task", using the jargon of the day. Ms. Jones has told them that the class will engage in a school-wide drama project, and her class's role is constructing stage props. The length of supports for scenes will need to be calculated so that lumber can be cut at appropriate lengths. For this part of the construction, finding the hypotenuse is critical, as money is short and errors costly.

The final class activity for the day involves a homework assignment in which students are requested to sketch one of the sets to be constructed, including a diagram of the framework and supports. Class will begin tomorrow with these sketches.

One might say a number of things about Ms. Jones's presentation, including that it was quite clear in both product senses above. Compare this
Mr. Smith sits at his desk, awaiting the arrival of his first period class. The bell rings as the last few students take their seats. He begins.

"Today we will discuss the Pythagorean Theorem. Does anybody want to explain it?"

"It has to do with triangles."

"Right, what about the hypotenuse?"

Pause...

Mr. Smith continues, "The longest side is the hypotenuse. The hypotenuse squared equals the sum of the other two squared. Johnny, if you have a right triangle with sides of length three and four centimeters, and you do not know the hypotenuse, could you figure it out?"

"Yes, it's three plus four squared, forty-nine."

"No, does anyone else think they know?"

Pause...

Mr. Smith answers his own question with, "It's five". He goes on to state, "The square of the hypotenuse is equal to the sum of the squares of the other two sides. What's that mean? It means that if you multiply the other two sides by
themself and then add them together they will equal the hypotenuse multiplied by itself. So the hypotenuse equals the square root of the sum of the squares of the other two." He assigns homework problems for the next day and instructs the students to begin working on them now.

Without continuing, again one might say a great deal about this lesson. One thing certain is that among other things, it is unclear, again independent of the particular product sense employed. He was both logically unclear and not well understood by his students. The reasons for the lack of clarity are difficult to pinpoint for certain. One might speculate that the teacher's knowledge, or at least his ability to communicate that knowledge, is less than adequate, given especially his first rendering of the theorem at issue. Second, perhaps his level of discourse was above the students' present ability level. One is unsure, given the paucity of checks on understanding. Third, the purpose for learning the material was never discussed, adding a possible motivational factor. In short, the lack of clarity could have resulted from any and all of these sources, and perhaps others.
We might add complexity to the situations above by mixing clear with obviously unclear presentations. Suppose that the teacher (Ms. Jones) had a clear presentation in that it was generally correct, and suppose that the students perceived the teacher to be clear, and yet specific information given was incorrect. For example, suppose in the sample problems the teacher shows the students a method of finding the square root that works for the sample problems, but is not generalizable to all problems. Would we say that the teacher's rendering of the Pythagorean Theorem was clear? Is this clear teaching?

Suppose that Ms. Jones is logically correct throughout and correct in all her information, but unable to be understood because she used language that students did not comprehend? What if she expected the students to do work for which they were ill-prepared? Granted, her questioning and practice sessions should catch this, but suppose it occurred nonetheless. Is she presenting a clear lesson to her pupils?

Imagine that Ms. Jones is logically unclear and factually wrong, but perceived by her pupils as being clear. This is a possibility when a teacher
dilutes beyond recognition content that otherwise would be quite complex and difficult (for the students and perhaps even for the teacher). For example, Ms. Jones might say that any problems that arise in a democracy are handled by the citizens voting on the way that government ought to act. Students might find this clear and easy to understand, but it is wrong. Is she teaching clearly?

One might add even more variables. What if students already know the material? Would the teacher’s presentation matter, short of being so bad as to cause confusion? Do we run into the problem of boredom with overexplaining? What if students are tired, lazy, or simply do not process the information? The teacher’s clarity or lack of clarity might not even be an issue.

What appears to be the case is that certain factors must be taken as given before we proceed. First, we must assume at least a minimum of student cooperation and interest, as well as grade-level ability. Second, we assume that the teacher has a minimum of subject matter knowledge. The basic paradigm of teacher engaging pupil(s) in some content with the intent to produce learning must be
intact. That is, we at least need a case of teaching before we can speak of clear versus unclear teaching.

In examining the cases of clear versus unclear teaching (model, contrary, and borderline), we can see a number of consistencies. For example, they are all cases of teaching; and the teacher seems to be engaging in some form of explaining in all the cases.

There are a number of reasons why, on first blush at least, one might begin a philosophical discussion of terms related to 'clear teaching' with an examination of the notion of 'explanation'. Hints come from the empirical work of Cruickshank et al., Bush et al., Kennedy et al., and Hines in the form of the power of factors or categories that were labeled "explaining" or that included items related to explaining behavior. In Bush et al., factors one and two were explicitly termed "explaining" factors. In the Kennedy et al. replication, "simple explanation" was cited as an intermediate level clarity discriminator, with at least two other factors made up in large part of explicit explanation items.
If one extends this to the Hines instrument, one factor ("explains the content of instruction") is primarily explaining behaviors, even from the perspective of the researcher, and a second ("provides for student assimilation/synthesis of content") is made up largely of items employing "explain" as the primary teacher action. It is obvious from the prominence of 'explanation' in the studies above that it is at least a part of operational 'clarity'. How large a part it is, however, is an open question at this point, and is a question addressed directly in this analysis.

A second hint comes from the early research reviewed by Rosenshine and Furst (1971) as the original support for the clarity-achievement link. For example, the Gage et al. (1968) work at Stanford, of which Rosenshine was a part, looked at lecture presentation/explanation and not clarity, specifically, yet Rosenshine and Furst include the study nonetheless in their review. This was criticized by Heath and Nielson (1974), Hines (1981), and Cruickshank and Kennedy (1985); but the criticism on this ground may be found to be too severe.
Beyond the empirical work, philosophical discussion of range terms (Ennis) and ordinary language versus technical terms (Munson) seems to indicate that an explication of 'teacher clarity' and conceptually related terms is warranted. In this regard, the philosophic use of 'explain' as a related concept to 'clear teaching' is broader than the use of 'explain' in the empirical research discussed here. It seems that 'to explain' in the empirical work is composed of teacher presentational behaviors only. While these are certainly prominent in the philosophical use of the term, there is much more ground to cover. Just what counts as 'explanation' conceptually is the subject of Chapter V, and an evaluation of explaining behavior is a part of Chapter VI.

Etymologically, to explain is to "open up the folds". It is to make plain, if not to make plane. The metaphor is vivid. It suggests that to explain something is to open it up, smooth it out, and make it visible. In short, it is to provide a reason for something so that we can see why or how it happens or is done. ...It "gives an account of" the thing to be explained. (Green, p. 148)

The teacher, according to Green, is almost always involved in this task. Explaining is a "logical act" of teaching. Since some logical
act(s), accompanied by some "strategic" act(s), are necessary for any exchange between teacher and student to be labeled 'teaching' (Green, pp. 2-7), and since explaining is so prevalent a teacher behavior, it is highly probable that 'clear teaching' will in some way be related to 'explanation'.

While one can come up with examples of teaching (even clear teaching) that do not immediately involve explaining behavior (Socratic questioning, nonverbal demonstration, e.g.), it is likely that at some time explaining will occur. Put differently, the scope or unit of study (micro versus macro) may alter the likelihood of a teacher engaging in explaining behavior. But as one places microscopic episodes of non-explanatory teaching in a larger, macroscopic context, explaining is more and more likely to occur.

We need, then, to address the scope of our study of teaching in order to be more accurate regarding what ought to be looked at or looked for. Hines, for instance, narrowed the scope of study to single-episode, laboratory teaching, allowing her to remove items irrelevant to that setting but wholly relevant, indeed integral, to teaching in
the natural setting. In this natural setting, items that look at clarity in terms of providing links between and among lessons are critical, as was borne out by Bush et al. and Kennedy et al. One question running throughout is how much of empirical 'teacher clarity' is covered by philosophical work on 'explanation'.

It is claimed that clarity is multidimensional, that teachers

...must do a number of things to be perceived by their students as being clear (Cruickshank, Myers, and Moenjak, 1975). They must, according to over a thousand middle and junior high students: orient and prepare students for what is to be taught; communicate content so that students understand; provide illustrations and examples; demonstrate; use a variety of teaching materials; teach things in a related step-by-step manner; repeat and stress directions and difficult points; adjust teaching to the learner and topic; cause students to organize learnings in meaningful ways; provide practice; provide standards and rules for satisfactory performance; and provide students with feedback or knowledge of how well they are doing. (Cruickshank, 1985, p. 44)

While the multidimensionality of 'clarity' might be characterized using other descriptors (Bush et al., Kennedy et al., Hines, e.g.), the point is made and acknowledged.
Even if empirical 'clarity' is found to be encompassed by 'explanation' in all its philosophic forms, this multidimensionality is not denied. 'Explaining' in the philosophical literature is multidimensional, also. The question addressed in Chapters V and VI is to what extent the several dimensions of 'clear teaching' overlap with those of 'explanation', construed in its widest philosophic sense.

Given the apparent centrality of explanation to teaching in the above sample cases, given Munson's insights applied to 'clarity' as an ordinary language term or Ennis's notion of "range terms" as might be applied to 'clarity', and given the power of the factors relating to explanation in the empirical work discussed in Chapter II, perhaps it would be helpful to look more closely at the notion of 'explanation' as a related concept to 'teacher clarity', as well as at factors that enhance, or detract from, explanations in the teaching context. Even if 'explaining' is found not to be logically required in 'clear teaching', its exposition can help us determine features of 'clear teaching' that might be missed without such analysis.
Summary and Conclusion

This chapter began with the operational definition of 'clarity' as employed in the Hines observation instrument. Of particular interest was the modification of the list of prime discriminators from the Bush et al. and Kennedy et al. studies and the Hines (1981) replication. The question of ecological validity of the study and of the use of the instrument in field settings is an important one. In addition, supplementing the COI with the Bush/Kennedy items is highly advisable in this regard.

A second concern is the extent to which 'clarity' functions as a technical term as well as a term in ordinary language, and the difference between the two. To the extent that 'clarity' resembles "range terms", or terms ordinarily imprecise, an operational definition has not been given, at least one that does not distort the concept as ordinarily (and correctly) used.

Finally, 'clarity' was approached as an ordinary language term via conceptual analysis. An important outcome of that analysis, combined with
what preceded it, is the dual product sense of 'clear teaching' - as a logically clear rendering of the content and as a clear perception of material from the point of view of the student. To the extent that the "student perception of clarity" notion is defined in terms of understanding or achievement, the danger of circularity and question-begging was noted. One way to alleviate this concern is to revise the overall notion of 'clarity' to include a logical rendering of content in addition to the psychological, "student perceived" component.

As stated above, 'explaining' broadly conceived seems to be prominent in our discussion of 'clear teaching'. What follows is a discussion of pedagogic explanations from several perspectives, employing the work of Jane Rowland Martin (Chapter V) and Robert Ennis, Israel Scheffler, and Jonas Soltis (Chapter VI).
CHAPTER FIVE

'EXPLANATION': CONDITIONS FOR USE

Having begun the analysis of 'clear teaching' from a philosophic perspective, at least three things might now be said. First, the range of the term seems much broader than the empirical work would lead one to believe. Second, it has become evident that a definition of 'clarity' developed at least in part independently of the intended outcome (higher student achievement) would be desirable. While it is true that the original list of items generated by Cruickshank et al. was provided by students independent of any explicit reference to achievement, later refinements of the list seem to incorporate student understanding into the definition of 'clear teaching'. It is to this second insight that the logical/psychological elements of 'clarity' speak. Adding items to the COI that deal with logical aspects of clear teaching will put some distance between the operational definition of 'teacher clarity' and the
outcomes intended, thereby addressing concerns over circularity.

Third, much of the ground covered by 'clear teaching' in the empirical research seems related to the teacher's ability at explaining, broadly construed. Whether or not other dimensions of empirical 'clarity' exist and need to be addressed will be determined as a result of the analysis of 'explanation'. It is to this analysis of the notion of 'explaining' that we now turn.

**Martin on 'Explanation'**

The primary interest in this phase of the analysis is the functioning of 'explanation' in a teaching context, in particular, as it relates to clear teaching. It is that "pragmatic" notion of 'explaining' that is the central focus of the work of Jane Roland Martin. Her exposition on 'explaining' is a conceptual study of what conditions must obtain for one to claim to be explaining something to someone else, or for one to have provided an explanation of something for someone. She sees this as being of primary importance to teachers, and, while recognizing
other uses of 'explain', spends most of her time on this issue of centrality for the educator (p.8). To detail her entire argument would be beyond the scope of this study. Elements of her study are critical, however, and will be used here to help get clear on major concepts.

**Ambiguities Explored**

Martin begins her discussion by pointing out the ambiguity of the terms 'explaining' and 'explanation', laying out five senses of 'explain'. One can explain by engaging in inquiry or research, as is the case when a sociologist explains rates of recidivism by examining correlations with other variables such as socioeconomic status, the nature of the crime committed, types of punishment, and attempts at rehabilitation. Martin labels this "explaining(R)", due to the research process involved (Note 1). She contrasts this with one who attempts to explain these phenomena to a sociology class. In the latter case, no primary research need be done; the task is a pedagogical one. Martin calls this "explaining(T)", for teaching. One might parallel this with the researchers doing empirical clarity work explaining(R) teacher
clarity behaviors; and one who presents this material to a class engaging in explaining(T) teacher clarity.

While a number of similarities exist between the R and T senses of 'explaining', they differ in that the R sense is a culmination, a success or "achievement" sense of the term (Ryle, 1949; Scheffler, 1960). The R sense of explaining is much like winning a race; it is not said to be engaged in, but to have been done. In contrast, the T sense is the process or "task" sense of the term. The emphasis is on the doing, with the outcome uncertain. That is, explaining(R) the phenomenon of recidivism suggests, among other things, that one has succeeded in coming up with meaningful associations between returning to prison and other relevant variables. To engage in the T sense admits of no such achievement. One might have outcomes in mind (indeed, one must have outcomes intended), but no assurance of achieving those outcomes is present.

Explaining(R) something and explaining(T) something to someone are doings, in other words, which are related in that each is intimately connected with knowledge, but the connection with knowledge in the one case is that of imparting or communicating while the connection with knowledge in the other case is that of finding or discovering. (Martin, p.16)
Explaining(R) involves the producing or generating of an explanation, while explaining(T) involves the giving of one. It would appear that the conditions for use of the T sense of 'explaining' are more relevant to the explication of 'clear teaching' than are the conditions for use of the R sense. The T sense more closely parallels the pedagogic act.

Given explaining R and T, Martin extends her analysis to two additional senses of 'explain'. She claims that one engaging in explaining(T) produces a related "explanation of something for someone" (p.19). She calls this type explanation(D), for discourse. The teacher, in explaining(T) that the hypotenuse squared is equal to the sum of the squares of the other two sides, is trying to produce an explanation(D) for the student. This notion of 'production' is different from that in explaining(R), however. Rather than engaging in research to develop or generate (produce) data to support a claim, the production process that results in an explanation(D) is one of organizing information and delivering it in such a way as to be understandable for the intended
audience, that is, giving an explanation.

Just as the explaining(T) of something has as an intended outcome an explanation(D), explaining(R) may lead to an explanation(F) - for findings of research - "explanations of something by someone" (p.19). One who has found that rates of recidivism vary inversely with socio-economic status has explained(R) an aspect of the phenomenon of a lawbreaker's chance of returning to prison. In writing a research article on the topic or in coding results of the inquiry in a notebook, the person has recorded an explanation(F) of the phenomenon researched earlier. As is probably obvious, "D" is of more interest to the study of 'teacher clarity' than is "F".

Martin claims that all four senses of 'explain' discussed above are "pragmatic". Yet the pragmatic dimension of 'explain' is complex. It is not simply the case that explaining is pragmatic because the act is engaged in for someone, as is the claim made by many, according to Martin. While both T and D senses are for someone, things are not so clear for the R and F senses. For the latter two there must be a "giver" of the explanation, however. They can therefore be thought of as
having a pragmatic dimension (Martin, p. 20).

Unlike her predecessors, Martin includes a non-pragmatic, context-free sense of 'explaining' as well. Just as physicists and mathematicians, and even philosophers, employ constructs "in the abstract", it is possible to speak of explanations in the abstract, so long as one makes no claims of talking about any of the above four types, which are in fact context-bound. She calls this abstract sense ("explanation of something") "semantic", or "explanation(S)" (p.22).

Since an explanation(S) is only a relation between one or more sentences and some thing or things, and since no one need be involved as giver, receiver, or producer of the explanation, an explanation(S) is not pragmatic. An explanation(S) is very similar to an explanation(F), yet there is one critical difference. An explanation(F) is a historical event, context-bound and therefore pragmatic, whereas an explanation(S) is not. Neither type is necessarily for anyone, though.

For example, an explanation(F) for the sun rising in the east and setting in the west is provided when one reports on the rotation of the earth about its axis while revolving about a
relatively stationary sun. Yet, before the movement of the earth relative to the sun was known (before someone explained(R) the above), an explanation in the abstract existed, according to Martin. It is this abstracted, semantic sense of 'explain' that Martin calls explanation(S). It is non-pragmatic because no one need be involved, as giver or as receiver.

As will be addressed later in the analysis, explanation(S) is relevant to the assessment of the logical aspects of a clear teaching episode. The assumption that a logical structure exists independent of the teacher's rendering and against which that rendering might be evaluated is close to Martin's notion of explanation(S).

In all, then, we have uncovered five distinct explanation notions, four of which are pragmatic and one of which is not pragmatic but is what I am calling semantic (Note 2):

(R) A explains E.
(T) A explains E to B.
(F) X is an explanation of E given by A.
(D) X is an explanation of E for B.
(S) X is an explanation of E.

(Martin, p. 25)

There may be other senses of 'explain', as well; but these five senses seem, according to Martin, to capture the breadth of the term's employment in philosophical discussions, especially as those
discussions might bear on education.

The sense of 'explanation' of most interest in this analysis of teacher clarity is "D", because we are concerned with what seems to be related to clearly understood explanations in a pedagogic context. That is, we are interested in explanations given by someone (teacher) for someone else (students). The "T" and "S" senses are related and critical to the logical aspects of clear teaching. They will be addressed in this section where appropriate.

In the course of this discussion, we need to get clear on what sense of 'explanation' is at issue in various parts of the inquiry. "Unless the various notions of explanation are kept distinct, it is all too easy to move from one to another in discussion without realizing it" (Martin, p.29). For instance, to criticize an abstracted explanation(S) because it does not conform to how people explain (R,T,D, or F) is to miss the point. The notion of semantic explanation does not pretend to mirror practice and thus should not be criticized on those grounds, but on whether or not it is a useful theoretical construct. Similarly, the logical aspects of explaining(T) need to be
held separate from successful explanations(D) if we are to avoid the ambiguity between process and product discussed earlier.

In an attempt to lay out the conditions for use of the sense of 'explain' of greatest interest to this study, we again look to Martin's analysis. She employs a tutor/tutee framework to develop a list of conditions necessary for explanation(D) (pp. 88-89). This analogy is especially useful in avoiding the oft-made and misleading connection between 'explaining' and 'telling' or 'informing'.

Central to this tutorial conception is the notion of rationality; to be a tutor (or teacher, for Scheffler, 1960, p.57) involves, among other things, acknowledging the "reason" of the tutee (or pupil). This conception of a rationality principle and the particular linguistic features of explaining/tutoring are central to Martin's array of necessary conditions to be listed and discussed below.

**Martin's Necessary Conditions**

Martin (pp.128-129) lists seven conditions which her analysis yielded as necessary (but perhaps not sufficient) for the claim that "X is an
explanation of something for someone" to be true.

Condition (a) is as follows:

the underlying question is sound, i.e.,
admits of a right answer or the tutor
believes, or at least assumes, that the
underlying question is sound, i.e.,
admits of a right answer. (p. 128)

The thrust of this condition is that the tutor
be attempting to explain something that reasonably
admits of a true explanation. If this were not the
case, there would be no sense in the tutor’s
engaging in the process in the first place. The
explanation of the sun rising in the east admits of
a true explanation, thereby meeting condition (a).

As an example of a question that does not
admit of a true explanation, one might imagine
attempting to answer a nonsense question such as,
"Why is Thursday orange?". Due to a category
error, this request for an explanation does not
admit of a true response. Another possibility is a
request for an explanation regarding information
that is assumed to be true, but in fact is not,
such as, "Why did Columbus explore the Northwest
Territory?".

Condition (a) relates most directly to the
content or subject matter being explained. As
such, it is somewhat peripheral to our interest
(student perceived teacher clarity) at this point.

The second, condition (b), states that

the tutor is rational and understands \( W \)
at the time of the episode, or thinks, or
at least assumes, he understands \( W \) at the
time of the episode. (p 128)

"\( W \)" refers to any subsidiary or indirect question
that might relate to the overall, underlying
question. Further, these subsidiary questions are
deemed important enough to play a role in the
tutee's overall ability to understand sufficiently
the question (and related explanation) at issue.

A tutor knowing that an engine seized (to use
Martin's example) because there was an oil leak,
without being able to relate the loss of lubricant
to increased friction between piston and cylinder
wall would have less than satisfactory
understanding. A tutor who was ignorant of and
thereby ignored this subsidiary question (and
perhaps others) would not have fulfilled the
conditions necessary for having given an adequate
explanation of engine seizure for the tutee.

This condition relates to the teacher's state
of knowledge regarding the subject matter. The
operational definition of 'clarity' seems to assume
reasonable subject matter familiarity and accuracy
of presentation (implicitly in Bush et al. and in Kennedy et al., and explicitly in Hines et al., p. 88), but this notion might require greater attention.

Condition (c) relates to the tutor's knowledge of the tutee's state of puzzlement.

...during the episode the tutor knows, or at least assumes that at the beginning of the episode the tutee was in some rational predicament with regard to the underlying question. (p. 128)

An exposition on the different tutee "predicaments" is not required here. Suffice it to say that the tutor must believe that the tutee is reasonably perplexed, that is, in a state such that the question at issue admits of a right answer, but the tutee cannot come up with it. Again, this appears to be a preliminary concern to the central interest — the process of explaining well or clearly.

Condition "d" is quite complex.

...in the course of the episode the tutor states the right answer or what he believes or at least assumes to be the right answer, to the underlying question, or that part of the right answer, or what he takes to be the right answer, that in his opinion the tutee must learn in order to understand W,

...or for good pedagogical reasons he states what he knows, or believes, or at least assumes is not the right answer to
the underlying question, but is in his opinion sufficiently related to the right answer so that it will not prevent the tutee from understanding W at some later date. (pp. 128-129)

This condition focuses on the tutor's task of helping the tutee see a continuous series of events or situations that lead from the initial question to the eventual solution. The number of steps, level of specificity, and sophistication is context specific and based on the judgment of the tutor.

According to Martin (as well as Ennis), a primary element in the giving of an explanation (D) involves "gap-filling". This is reflected in condition (d). She is critical of some ideas of gap-filling that involve the "continuous series" notion, yet the task of the explainer is very much that of filling gaps.

In an explanation we can discuss two parts,

...the explicandum (the thing to be explained) and the explicans (the material actually offered in explanation)
... To have a complete explanation as the term 'complete' is here used, is to have sufficient material to make what is essentially a deductively valid argument yielding the explicandum as the conclusion. (Ennis, pp. 261-62)

For instance, if a student asks a teacher to explain why the steel mills closed in northeastern Ohio, and the teacher responds that profits
dwindled, we have a situation in which the explicans (profits were dwindling) is not sufficient to lead deductively or logically to the explicandum (the steel mills closed). The student must fill a gap, and the teacher assumes that the student has sufficient prior knowledge to do so.

An incomplete explanation, then, is one in which the explanatory material does not by itself logically imply the explicandum. Explanation can be completed by adding material which together with the explicans does imply the explicandum.

Please be clear that 'complete' is here a technical term. To say that an explanation is incomplete is not to say that it is defective. It is merely to say that the connection between the explicans and the explicandum has not yet been made explicit. And to say that an explanation is complete is not to praise it. Some complete explanations are very bad explanations. (Ennis, p.262)

Seldom is it the case that a tutor (teacher or explainer, as well) needs to offer anything like a logically complete explanation. To offer complete explanations might even be negative, leading to information overload and boredom. Rather, incomplete explanations are offered in which, in the judgment of the explainer, the explainee is asked to "fill the gaps" with knowledge or inferential leaps within reasonable limits. If the explainer is a good judge, and perhaps if
conditions (b) and (c) are met, gap-filling is no problem and the explanation is successful.

In a pedagogic context, however, things are not so simple. As anyone who has attempted to teach a group of people can attest, individuals vary with respect to the size of gaps that are "bridgeable". One must be wary of boring "large-gappers" and losing "small-gappers" with an explanation geared to people capable of medium-sized inferential leaps. While individualized instruction is generally the prescription in such a situation, how one is to accomplish this individualizing is the pedagogic puzzle (Note 3).

Especially helpful in this process is the need to "shift the question" (Martin, p. 44). In answering the query "Why did the engine seize?", one might respond "It was due to an oil leak." Whether or not this adequately explains the phenomenon is dependent upon, among other things, the ability of the parties to shift to other, related subsidiary questions like "Why does loss of oil lead to engine seizure?" and/or "How did the leak come about?". The precise question to which one must shift is context specific. Depending upon
the initial question, the level of sophistication of the participants, and the needs of the questioner, among other things, particular subsidiary questions will vary. Yet Martin notes correctly that these questions need to be addressed, implicitly or explicitly, in explaining(T) to fill gaps in understanding and to provide an explanation(D).

It would appear that condition (d) would be extremely important for the analysis of 'clear teaching'. The whole focus is on the tutor providing the tutee with whatever information is needed for the tutee to understand the subject matter. Such is obviously the defining characteristic of the notion of 'clear teaching' that adopts the student perspective criterion, as does the empirical work reviewed in Chapter II (Cruickshank et al., Bush et al., Kennedy et al., and Hines).

While great strides have been made by employing this notion of filling the gap between the tutee's knowledge about the phenomena discussed and the tutor's conception of the actual state of affairs regarding these phenomena, a number of important issues remain unaddressed. No claims are
made as to the truth of the connections, at least not explicitly. The logical aspect of 'clear teaching', that second product sense discussed in Chapter IV, would seem to require that students not only perceive connections, but that those connections in fact be accurate.

In addition, the view or perception of the explainer with respect to the explainee's state of mind is not clearly defined. To deal with these and other related deficiencies, Martin explores the role of explaining with regard to answering questions and giving reasons (as well as with regard to explaining involving a special use of language) to arrive at the remaining necessary conditions for explanation(D).

Condition "e" relates to the need for greater specificity regarding the explainer's addressing the explainee's present knowledge state. Condition (e) states that

...in the course of the episode the tutor also provides or attempts to provide the tutee with answers to such subsidiary questions as he (the tutor) thinks necessary or effective or at least helpful for removing the basis of the predicament he deems the tutee to be in. (p. 129)
It draws concern to the answering of subsidiary, or indirect, questions (W) relevant to the tutee's predicament. This is an extension of the gap-filling notion, with explicit attention given to the need of the tutor to consider the level of sophistication of the tutee, thereby gauging the size of the gap to be filled.

An animal trainer coaxes a tiger to jump through hoops by beginning with an existing, freely emitted behavior and then reinforcing closer and closer approximations to the desired behavior. If the trainer makes the steps too large, demanding that the tiger progress too quickly, the shaping process is disrupted and the trainer must regress to the most recent successful trial and reduce expectations at the next level. Analogously, the explainer must not expect the receiver to bridge gaps that are exceedingly large.

As an additional point we might focus on what MacMillan and Garrison (1983) see as a necessary condition for teaching, the answering of a question. The notion of question-answering is prominent throughout Martin's account, if somewhat beneath the surface. Both Martin and MacMillan and Garrison rely on the work of Sylvain Bromberger
Answering the questions that surround a tutee's intellectual predicament is central to Martin's notion of explanation (D). In this regard, she is in agreement with MacMillan and Garrison. Where Martin restricts her argument to 'explaining', MacMillan and Garrison speak of the answering of questions as a necessary condition for 'teaching'.

*To teach someone something is to answer that person's question about some subject matter.* ...Put more fully: any fullblown teaching claim entails the further characterization of the teacher as answering some question which might be put by the student concerning the subject matter. (p.157)

The point of this claim is not that all teaching is made up of the answering of questions put to the teacher by students. There are many things that teachers do while teaching ("peripheral acts") that are not at all within the realm of question-answering. A teacher praises and blames, counsels, motivates, plans, and disciplines, among other things. These are what Green calls "strategic acts" of teaching, and they can occur independent of the "intellectual acts" spoken of by MacMillan and Garrison.
Green uses the term "logical acts" as a parallel to "intellectual acts". For example, Green includes teacher behaviors such as explaining, concluding, inferring, giving reasons, amassing evidence, demonstrating, defining, and comparing as logical acts (p.4). They are defined as those acts which, along with the strategic acts, are necessary for an episode to be considered a case of 'teaching'. The difference between logical and the strategic acts is that logical acts are evaluated independent of consequences, whereas strategic acts are good or bad as a result of their impact on the teaching/learning process. It is not the case that all logical or strategic acts must be present, or that any one in particular need be present, only that one or more of each be found in the episode (Green, p. 6).

In the "erotetic" approach to teaching, the initial focus is on the "intellectual acts". To describe what goes on in teaching without mentioning the intellectual acts is parallel to telling what happened at a bridge party without mentioning the bidding and play of cards, or to talking about a golf game without mentioning the clubs, ball or strokes made by the players. (MacMillan and Garrison, p.158)
Of central importance to intellectual acts, what distinguishes them from other human interactions, is that they are "speech acts", or auditor-directed acts. Further, these auditor-directed acts must involve the speaker having "assumptions beyond the basic language-and-act understanding assumed of the others" (p.158). This is different from speech acts generally, in that one

...who describes, explains or narrates something to an audience must make assumptions about the audience's knowledge of and interest in the subject under consideration. One can warn without assuming that the hearer is interested in being warned, but one cannot explain the tidal flow or describe a process to someone without assuming that the hearer is in some particular intellectual or epistemological state with regard to the subject being discussed. (MacMillan and Garrison, p.158)

While there are people, according to MacMillan and Garrison, who hold that teaching occurs only when explicit questions are asked by the students and answered by the teacher or the teacher in conjunction with the students, that is not the position they take (or the one taken here).

It is not that the auditor does ask the question, or that the teacher even believes that he would ask the question, but rather that the teacher believes that in some sense, the student ought to ask the question. (p.159)
It is the "epistemological ought" that places questions at the logical center of teaching. Whether the question is made explicit or not, answered directly or indirectly, and so on are strategic, peripheral concerns, not logically necessary ones.

In sum, as intellectual-actor, the teacher must assume that in regard to the subject to be explained, described, or demonstrated, the students ought to ask a question; we will call this an "epistemological ought", and the intellectual state of the students an "intellectual predicament" with regard to the subject matter. The epistemological ought is defined by the intellectual predicament. (MacMillan and Garrison, p.159)

The "ought" is not meant as a moral duty or responsibility; it is simply a part of the "epistemology of the situation". Given the status of the student's grasp of the subject matter, a question ought to be asked of the teacher. The teacher's reactions can then be tied to students' intellectual needs, with the logic binding teacher, student, and subject matter being "erotetic logic" - the logic of questions.

It is the intention of teaching acts to answer the questions that the auditor (student) epistemologically ought to ask, given his intellectual predicaments with regard to the subject matter.
...intentional intellectual acts hit their marks when they satisfy the semantical and syntactical demands of the questions the students epistemologically ought to have asked given their intellectual predicaments. (MacMillan and Garrison, p.160)

There are a number of unaddressed questions with respect to the "epistemological ought". As stated above, first, we are not saying that a question ought to be asked in a moral sense, or even that a particular subject should be taught. These are strategic issues, not logical ones.

Second, the questioners need legitimately to be puzzled about that which they ask; they must be asking "genuine questions" (see Note 3). One does not sensibly ask questions about content that is not puzzling. Granted, teachers may seem to do this. But it is more accurate to say that their intellectual predicament is not with the subject (or at least should not be) in such a case, but with the student's state of knowledge of the subject. They are asking, in other words, "test questions" (again, see Note 3).

Third, the epistemological ought in no way determines the teacher's moves. Choice of subject, the implications of certain lines of questioning, desired level of student understanding, and so on
will affect the teacher’s choices. These are strategic concerns separate from the intellectual acts.

One would assume that for a student to perceive a teacher as clear, that teacher must be answering relevant questions (again, from the student’s perspective). Those questions (primary or subsidiary) and the teacher’s answers play a central role in determining clarity and the adequacy of explanations.

A close examination of the logical role of questions in the act of teaching or explaining is clearly related to much of Martin’s position. It lays the foundation for the relationship and interaction among teacher, student, and subject matter. It also falls in line with Martin’s claim that the student’s rationality must be recognized if one is said to be explaining.

Condition "f", the rationality condition, emphasizes a critical aspect of all teaching, explaining included, and serves to help distinguish ‘teaching’ from ‘telling’, ‘indoctrinating’, and ‘informing’.

...in the course of the episode the tutor encourages or allows the tutee to exercise, or at least does nothing to
prevent the tutee from exercising, his
reason and judgment with respect to the
underlying and subsidiary questions and
the answers to them given the tutee by
tutor. (p. 129)

Following the work of Scheffler, Green, and
others, Martin stresses here that for one to have
given an explanation of something for someone, the
receiver of the explanation must be able to call
into question the explainer's grounds for making
the claims. The tutee-as-critical-thinker, at
least as a potentiality (and perhaps as a goal) is
vital to an explanation(D) episode (or teaching
episode, for that matter).

For example, if a teacher is presenting a
lecture on the morality or immorality of the
Vietnam War, and in so doing never allows students
to question the criteria employed in making the
moral judgment, or the match between the conditions
surrounding the involvement of the United States in
Vietnam and those moral principles, then one might
question whether teaching is actually occurring.

According to Scheffler (1960, p.57),
'teaching' implies that one consider the reason of
the pupil. To fail to do so falls short of
teaching. We might say that the professor is
telling students, or indoctrinating them, but not
teaching them.

One must be wary here, however. In fact, we often use the word 'teaching' to refer to just such situations. It appears that Scheffler and Green border on the normative in that their claims seem rather to be that one ought to yield to reason. In the world, much called "teaching" does not yield to reason. We either have to recognize this or engage in programmatic stipulation to win what otherwise would be a normative point.

No obvious connection can be made between the rationality condition and 'clear teaching' beyond the fact that 'clear teaching' be a case of 'teaching' generally construed. If 'teaching' requires the inclusion of the rationality condition, then so does 'clear teaching'. Beyond allowing students to ask questions of clarification (found, by the way, in all of the lists of clarity behaviors), there is no apparent necessity of this condition for 'clear teaching', however. Again, it would appear to be desirable, but that is another issue.

Finally, the tutor may have done all of the above and still not have produced an explanation (D). The question could have been
sound, W understood and addressed, and so on; but if the tutor does not organize the relevant material and present it to the tutee (i.e., meet the linguistic condition stated below), no explanation(D) has taken place. The tutee may have engaged in an inquiry process and finally understood the desired content, but without the tutor's presenting the material verbally, there is no explanation(D). Thus one encounters the need for condition "g":

at the end of the episode the tutor has organized for the tutee and stated to him the answers mentioned in (c) and in (e). (p. 129)

One point of importance that might be gleaned from the above is that 'explaining' overlaps to a great extent with 'teaching', yet the former is a more restrictive term than the latter. Put differently, one way to teach is explaining(T). Further, one hopes to come up with effective explanations(D) - explanations not only intended for another, but explanations that function for another. But one can teach (adopting a microscopic perspective for looking at teaching, as discussed in chapter four) without explaining. What appears to be the critical condition necessary for
'explaining' that is not required for 'teaching' is Martin's linguistic condition. 'Explaining' requires a particular use of language that is not demanded by all cases of 'teaching'.

Summary and Conclusion

Martin's first three conditions relate to the content, to the teacher's knowledge of the content, and to the teacher's knowledge of the student's intellectual predicament relative to the content. All of these are critical, if somewhat beneath the surface, in the empirical work done on 'clarity'. It might be advisable to include some assessment of these concerns in any overall clarity rating. The problem would appear to be one of judging the above. No checklist will likely work. But to leave these concerns out because they are not readily observable is to distort the concept of 'clear teaching'.

Adding items from Bush et al. and Kennedy et al. that were eliminated from the CDI would at least address the teacher's knowledge of the students' intellectual predicaments, and that would be an improvement of the instrument in terms of
coverage of the prime discriminators of clarity. Use of the instrument is made more complex, however.

Conditions (d) and (e) relate to the gap-filling notions central to explanation (D) and are obviously involved in the empirical work on 'clarity'. Less obvious are the connections between the rationality principle, condition (f), and the linguistic condition, condition (g).

As stated above, recognizing the student's reason is seen as a necessary condition for all teaching, according to Green and to Scheffler. But this may be more normative than descriptive. To the extent that this assessment is accurate, the same may be said for 'clear teaching'. Independent of this concern, however, all lists of clarity behaviors include student questioning and the teacher's response to those questions as being critical to clear teaching. Students seem to agree with Scheffler and with Green, at least in terms of the importance of questioning broadly construed. The nature of the questions is not well specified in the empirical work, however.

The linguistic condition places a restriction on teaching method in that, while all explaining
does appear to require that the explainer organize and present the material in some way to the explainee, no such requirement exists for 'teaching'. This is significant not only as a conceptual distinction but also as a point about 'clear teaching' as used in the present line of inquiry. If 'clear teaching' as used in the empirical research reviewed does require the meeting of the linguistic condition, then we have a narrower sense of 'teaching' than one might ordinarily employ.

That is, 'clear teaching' is more restrictive in the present line of empirical research than 'teaching' not only in that particular results (student perceived clarity) are implicit, but also in that a particular method must be employed. At least insofar as the empirical research on 'clarity' is concerned, the "explaining" factor puts a limit on method. This is the case especially with Hines, but it also seems to be true with Bush et al. and Kennedy et al. Only one item in the Busk/Kennedy list ("shows us how to do the work") allows the possibility of nonverbal demonstration.
This particular restriction might also lead to a narrower sense of 'clear teaching' than one would ordinarily accept. Can the teaching of the Pythagorean Theorem via Socratic questioning be an example of clear teaching? Is an artist able to teach clearly by demonstrating (but not speaking or writing about) the appropriate way to stroke a canvas? Conceptually, both are answered "Yes". Operationally, using the Hines instrument, it is highly unlikely, if not impossible. The Bush/Kennedy work falls in line here, as well. The clarity instrument should be reconstructed to account better for the above possibilities. Perhaps the method of gathering the data (asking students, probably exposed primarily to didactic instruction, to report behaviors that clear teachers employ) is a problem. One might wish to supplement this mode of data gathering with others, such as the assessment of the logical properties of the content delivered, as well as the assessment of alternative clear teaching behaviors beyond lecture-oriented presentations.

The linguistic condition allows us to draw more precisely the difference between 'clear teaching' and 'good teaching'. It appears that
'clear teaching' as employed in the empirical research is much more closely related to 'explaining' than to 'teaching' writ large. Clear teachers need not logically be explaining; but in terms of the Bush et al., Kennedy et al., and Hines research reviewed here, they must.

We are looking at expository, lecture-type teaching and not inquiry, modeling, or solely demonstrative teaching (via movies, pictures, lab experiments, and so on). 'Clear teaching' as employed in the research (and conceptually) overlaps with 'good teaching', but is neither a subset of nor equivalent with 'good teaching'. Sometimes to be clear is to be good, and to be good is to be clear, but not always.

We again have a problem that seems to have arisen from the difference between a term's ordinary use and the technical employment of the term in a research context. There are many good reasons for narrowing and making more precise the scope of a term's meaning in the conduct of research. The problems enter when the same term, taken out of the confines of the research context, begins to function in ordinary language again. The caveats emanating from the narrowing of scope are
lost, and what applied only in the stipulated use
become applied in the reportive, common use.

As a final point, and as an illustration of a
difference between 'good teaching' and 'clear
teaching', the issue of dependent variables used
for "successful" teaching enters. A great deal of
the resistance to the effective teaching literature
falls out of the reliance of that literature on
rather narrow notions of teaching/learning
outcomes. To the extent that the clarity research
is a part of this broader body of research, it too
can be similarly criticized. The above analysis
points to a possible cause for the narrow scope.

Since 'clear teaching' in all the empirical
research reviewed here seems heavily weighted
toward lecture and teacher direction and away from
student inquiry and independence, the dependent
variables make sense. When one is concerned with
other outcomes (student critical thinking,
creativity, civic courage, developing and acting
upon moral convictions, and so on), one might want
to move to teaching techniques that engender
dissonance and ambiguity, and not clarity (at least
not immediately). This discussion will be picked
up again later. Suffice it to say that 'good
teaching' and 'clear teaching' are not always the same. The intended outcomes, as much as anything else, will go a long way to determining what types of teaching will be "good" or "effective".

Martin's explication of seven necessary conditions for 'explanation(D)' is a major stride toward the goal of laying out the notion of 'explanation' as it relates to clear teaching. She does deal with an ambiguity in the use of 'explanation' with her five senses of the term. But other ambiguities exist, including the possibility of different types of "explanations for". Ennis, among others, is quite helpful here and affords us enhanced illumination regarding the clarity of pedagogical presentations. Ennis also represents a point of overlap, with his emphasis on the gap-filling function of explanation (Martin's conditions "d" and "e").

This gap-filling, combined with elaborations by Munson and by Soltis, fills out the conceptual exploration of the notion of 'explaining'. Another point of continuity is that, where Martin provides conditions for use, Ennis extends to criteria for evaluating explanations. Further, with Soltis we get a way to look at "satisfying" as opposed to
"logically complete" explanations. By combining their work, we will be better able to answer Research Questions 3 and 4. The movement to the second set of questions regarding the inhibitors to clarity (5-8) will also have begun. Chapter VI addresses these added features of 'explanation' as seen through the eyes of Ennis, Green, and Soltis.
Reference Notes

(1) Throughout the discussion of Martin’s different senses of ‘explain’, the R, T, F, D, and S indicators will be put in parentheses rather than appear as subscripts, as they do in Martin’s text, due to the style of print employed in this work.

(2) The actual quote from Martin is in error. For explanation(D), the text reads, "(D) X is an explanation of E for A". However, A has been used throughout the quote as the explainer and not the explaineer. The person receiving the explanation has been designated by "B".

(3) There is a difference in terms of the completeness of explanations called for, depending upon whether one asks a "genuine question" versus a "test question". Quite often, genuine questions of puzzlement are asked in a pedagogic context by students of a teacher, and the teacher’s response is characterized by gap-filling. Test questions, typically asked by a teacher of students, call for something closer to logically complete explanations rather than for explanations to fill gaps.
CHAPTER SIX

CRITERIA FOR EVALUATING EXPLANATIONS

In Chapter V the explication of the term 'explain' was begun, as it appeared to be a related concept to 'clear teaching' as used in the empirical research reviewed in Chapter II. Martin's necessary conditions, as well as her initial point regarding the ambiguity of the term itself, were central to the analysis. Yet there is still more to uncover about 'explain', including additional ambiguity. It is to this end of completing the understanding of 'explain' as it might relate to 'clear teaching' that we now must turn to the work of Ennis, Scheffler, and Soltis.

Having done this, not only will we have the conditions for use of the term, but also a way to evaluate a variety of categories of explanation. By combining the material in Chapters IV and V with the material in this chapter, we might better understand 'pedagogical explanation' and how it relates to 'clear teaching' as an ordinary language.
concept and as employed in the research program that serves as the focus of this study.

Ennis on 'Explanation'

Explanations, for Ennis, fall into three major categories: interpretive, descriptive, and reason-giving (Chapter 14). The first, interpretive, is often labeled "definitional", due to its function of defining or classifying terms. A descriptive explanation, in contrast, does not interpret or define a term; it describes structures and/or processes. Reason-giving explanations, the third category, focus on a variety of contexts calling for the offering of reasons of different types in an attempt, according to Ennis, to answer the question "Why?".

It can be argued that both descriptive and reason-giving explanations answer the question "Why?", however. Put differently, asking "Why?" is ambiguous in at least two ways. One may read "Why?" as asking "How does it come about that...?", thereby calling for a descriptive explanation. One may also read "Why?" to mean "For what reasons...?", requiring a reason-giving
explanation. Ennis seems to pass over this ambiguity, but his three-part breakdown is still useful. The next section will deal with 'explanation' in these three general categories, in an attempt at making firmer our understanding of the term as it relates to 'clarity'.

Interpretive Explanations

In the course of teaching a lesson, a teacher will inevitably come up against terms that must be explained, defined, to aid the students in the progression toward knowledge. Recall that Green (p.4) regarded "defining" as a logical act of teaching. To call merely for a defining of terms that are confusing to students is not necessarily to yield clarification, however. Terms may be defined in a number of different ways, depending upon the interest of the person offering the definition.

One way to look at definitions is structurally. Scheffler (1960, p. 16) gives a rather standard account of the definitional formula:

\[ \text{Definiendum} = \text{df} \text{Definiens}. \]
The definiendum represents the term to be defined and the definiens, the defining characteristics. While our concern is more definitional function than structure, using this formula as an algebraic ideal does bring out a number of functional features of definitions that will be discussed below (e.g., notions of equivalence, mutual replaceability, emphasis, purpose, and so on).

According to Ennis, a term may be defined in at least three different ways (or for three different purposes), with combinations of the three possible. Paralleling Scheffler (1960), Ennis lists the three main definitional categories, based on the function they serve, as follows: the descriptive/reportive, the stipulative, and the programmatic or persuasive. While all fit the structural formula above, each category serves a different purpose and, in fact, offers different explanatory material.

The purpose of a descriptive/reportive definition is the explanation of a term's usage; the definition attempts to report on, or mirror, ordinary uses of the term as employed by knowledgeable users of the language. One begins with the term to be defined (the definiendum) and
proceeds to the defining characteristics (the definiens) in an attempt at equating the two via accepted use.

One might use a variety of techniques in offering such a definition. The use of examples/non-examples, synonyms and antonyms, and classification systems (subsuming a concept within broader notions, e.g.) are techniques that teachers can employ to accomplish the above. Independent of which technique is employed, the interest of the profferer of a descriptive/reportive definition is in providing understanding of how terms are ordinarily used.

One very useful way to check the adequacy of descriptive/reportive definitions is through the use of counterexamples. Using the definitional formula above, a counterexample to a descriptive/reportive definition would show that the definiendum did not equal the definiens. Either the definiendum outstrips the definiens, resulting in a definition that is too narrow and restrictive (exclusive), or the opposite, in which the definiens includes elements not ordinarily attached to the definiendum (inclusive). A third possibility is that the definiens does not cover
all aspects of the definiendum and at the same time includes uses not ordinarily a part of the definiendum, that is, it is both exclusive and inclusive (Munson, pp. 128-130).

An example of the first case of inadequacy (exclusivity) is the following:

"A court of law is where criminal cases are tried."

Obviously, a counterexample illustrating the restrictive quality of the above is a civil case, which is also tried in a court of law.

An example of the second error (inclusivity) might be:

"A court of law is where all legal disputes are settled."

Again, an obvious counter to the above is that some legal disputes are settled out of court.

Finally, consider the following:

"Learning is a change in behavior."
A counterexample might be finding cases of "changes in behavior" that one would not ordinarily call "learning". For instance, getting drunk changes behavior, but seldom is it accepted as 'learning' (as is the case with falling asleep or getting hit by a truck).

Similarly, we can find cases of 'learning' that do not manifest themselves in changes in behavior, unless one sees behavior change in terms of potential to change, or in terms of newly established neural connections or mentalistic phenomena. For instance, I learned that the criterion for judging the color of a palomino is whether the color of the horse is within one shade of a newly minted gold piece. I can see, however, no recognizable behavior change associated with that obvious case of learning. Thus, the original definition is both too narrow and too broad.

The same might be the case for the operational definition of 'teacher clarity' employed in the Hines instrument, as discussed in brief in Chapter IV. The items on the COI both restrict 'clarity' and include items that may not legitimately be called 'clarity'. The first point has been shown; the second is possible, but as yet not
substantiated. The Bush/Kennedy list is less restrictive, in that it includes items related to clarity that were eliminated by Hines, but they still focus on the lecture mode to the exclusion of other potentially "clear" methods. Whether the Bush/Kennedy list includes behaviors not legitimately tied to 'clear teaching' is also unsubstantiated as yet.

Teachers and students use counterexamples all the time. Many will not recognize what they are doing, and they will operate with varying degrees of skill. A careful and systematic use of counterexamples is a very powerful tool in checking not only definitional statements, but also many other claims used in argument and discourse.

A number of things are illustrated by the use of counterexamples. Among the more important is the implicit rejection of the "reference" and the "idea" theories of meaning. For fuller discussion of this, see Munson (pp. 31-36, 52-53). In brief, the referential theory of meaning states that the meaning of a word is that to which it refers. A table is the four-legged object on which I place my coffee cup and a bird is that thing that flies by and dirties my car window. We can define a term,
in the reference theory, via some ostensive
definition; we can "point to" (literally or with
language) the appropriate referent.

While referents to words like 'table' and
'bird' abound, many words ('of', 'but', 'and',
e.g.) have no referents. In addition, words or
phrases can have the same referent and not mean the
same thing. The "thirty-eighth president of the
United States" and "the man who was nearly
impeached in 1974" have the same referent, but they
carry very different meaning. These and other
objections show the inadequacy of the referential
theory. By itself, it simply cannot give a full
account of meaning.

The second theory, the "ideographic" or "idea"
theory of meaning, also has its adherents. In this
theory, meaning of language is the particular
action, idea, or feeling that a word or phrase
causes in the hearer/reader. For example, the
word 'stop' is the particular action or feeling
engendered in the receiver. If the person stops,
then that is the meaning of the word. In addition,
one can speak of the meaning of a song title as
being the feeling of warmth, sorrow, joy, or
patriotic zeal felt by the listener.
But what if the person in the first example does not stop? Has the word lost or changed its meaning? Further, different people may react differently to the same phrase (song title). What does this suggest for meaning?

While it is true that connotation varies, meaning must be more consistent than the above would lead one to believe. If words only mean what we feel, how can I know how my words will be taken? How can I be reasonably sure that I will be understood? In fact, one need not worry about such things. While clear writing is often difficult, one can reasonably expect that the reader will decode the message in a way consonant with the intent of the writer.

There are other problems with the "idea" theory (the concept of 'idea' is not well defined, the same idea could easily accompany different, non-synonymous words, e.g.). What is clear is that, while connotation is a factor in meaning, it is not the whole story. The idea theory of meaning is inadequate in and of itself to account for meaning.

Words gain meaning through consistent use. That is, we attach meaning to words by agreeing to
use them in certain ways, by establishing socially accepted conditions for use. This "use" theory is at the base of all descriptive/reportive definitions in that it is the function of a descriptive/reportive definition to "report on" a term's accepted use. It is to this end that dictionaries strive.

Seldom will a dictionary give us the conditions for use, something that was of concern with respect to 'explanation', for example. While a dictionary will give us uses of 'explanation', to get conditions for use generally requires the employment of conceptual analysis. This is not the concern, necessarily, of the giver of interpretive explanations, however. The task for the definition-giver is to report on the correct use of the term or phrase at issue (assuming that a descriptive/reportive definition is asked for and not some other kind).

The notion of usage being the foundation for a theory of meaning bears directly on our discussion of 'teacher clarity' in that throughout we are trying to look at how the use of the term in research (stipulative definition) compares with its ordinary usage (which might be captured in a good
reportive definition).

In contrast to descriptive/reportive definitions, stipulative definitions need make no attempt at mirroring usage. Rather, the stipulative functions as a terminological legislation, setting forth rules for use of a term during the course of discussion. The interest of the profferer is abbreviating utterance and increasing vocabulary. Utterance is abbreviated by beginning with the definiens and moving to a definiendum that will be equated with the definiens during the particular discourse. That definiendum may or may not have a prior use; the point here is that for the situation at hand, the use of the term has been set arbitrarily via the stipulation (Scheffler, 1960).

Another way to state the prime characteristic of a stipulative definition is that it represents an announcement regarding the way a term will be used for the duration of the discourse. As an example of stipulation, consider the task of a researcher attempting to talk about an array of teacher behaviors that seems to be connected empirically to higher scores on tests of mathematics and reading achievement. Suppose the
list of behaviors numbers ten. Instead of having to repeat the litan

ey of behaviors, one to ten, every time the array needs to be dis-

cussed, the researcher decides to label the array (definiens)
"direct instruction" (the definiendum).

In effect, the researcher has said, "When I want to refer to behav-

iors one to ten, I will say 'direct instruction'." Utterance has been ab-

breviated, and the relevant community of readers and users of the re-

search has a new phrase in its repertoire (increased vocabulary). Scheff-

ler (1960) makes a point of differentiating between stipulating and re-

porting usage, with the key difference being the interest of the pro-

fferer, the function to be served by the definition.

The Hines instrument serves as a stipulative definition of 'teacher clarity' in similar fashion to the 'direct instruction' example above, albeit arrived at through a different route. What is important here is that the stipulation needs to be kept in the forefront of any discussion of the instrument. To confuse stipulation with description of common use is quite misleading.

The third category of definition, programmatic (also called "persua-

de", "rhetorical" and/or
"loaded"), can begin with a focus on either the definiens or the definiendum; but in the process of moving from one to the other, the profferer weaves into the definition a plan of action or moral point of view. This plan of action or point of view is presented such that, to accept the definition is to accept the moral or pragmatic position which is woven into it. In this sense, a programmatic definition is offered to persuade the listener, to win one over to a particular position or perspective.

For example, Scheffler (1960) talks of some people defining the word 'curriculum' as all that impacts on the child in the school setting. This includes not only the standard elements of the "curriculum" - courses of study, texts, discussions of course material, objectives, and the like - but also the emotional and physical well-being of the child. If one accepts this definition of 'curriculum', a stipulation that goes far beyond the ordinary use of the term, and if one accepts that schools and teachers are responsible for the curriculum (a point difficult to dispute when taken in isolation), then one is hardpressed to argue against free or reduced lunch and breakfast
programs for needy children or school-run programs to fight child abuse.

A counter to the above, again according to Scheffler, is to say that 'curriculum' does not ordinarily include these "extras" (narrowing the scope of the definition to one more in line with prior use), and that schools ought not be held responsible for providing for the child's welfare in these areas.

Both sides employ programmatic or persuasive definition to win the point. The first couples the program to be supported with a stipulation, while the second couples the program with ordinary use. What one must recognize is that to argue via definition is not to argue at all. In this case, the point is one of resources, responsibilities, and moral choices; and the position one takes ultimately must be justified. Simply offering definitions, independent of type, will not do.

If one looks closely at the operational definition of 'teacher clarity' as presented in the COI, a case can be made for a programmatic stipulation. Intentionally or unintentionally, the definition leads one to a narrower view of 'teaching' and achievement than one might
ordinarily employ. To the extent that one accepts
the definition uncritically, and to the extent that
one sees 'clear teaching' as described, the
definition could serve to undergird a restriction
on method of teaching and on desired student
outcomes. The ramifications are especially broad
if one considers the move to including knowledge
gained from this research in the curriculum for
preservice teacher education without first
examining the programmatic content of the 'clear
teaching' definition. The same is the case with
respect to the lists of prime discriminators
generated by Bush et al. and Kennedy et al.

The above is a brief overview of interpretive
explanations, important for two reasons beyond the
possible programmatic nature of the empirical
definitions of 'clarity' just discussed. First,
interpretive explanations are an integral part of
teaching. Second, the act of defining/explaining
unfamiliar words has a place of prominence on the
Bush/Kennedy list and on the Hines instrument as a
prime discriminator of clear teaching.

It would appear that, to be clear, a teacher
ought to provide a definition that suits the needs
of the context of teaching (i.e., relative to
teacher, student, content, and purpose of the lesson. In addition, all persons involved need to be cognizant of the functional category employed. For example, a student hearing a stipulative/programmatic definition and thinking that it is reportive is likely to be misled.

For a definition or interpretive explanation to function as a part of clear teaching, then, both product senses of 'clear teaching' ought to be addressed. The logical aspects are related to the functioning of the definition in the teaching context, relative to teacher, student, content, and purpose. The psychological aspects are covered when the definition "satisfies" the student in the sense of resolving an intellectual predicament regarding the term at issue.

The use of interpretive explanations does not exhaust the teacher's explanatory reserve, nor does it address all student requests for explanation. The second category of explanation used frequently by teachers, descriptive explanations, follows.

**Descriptive Explanation**

Descriptive explanations function to trace steps in a process or elements that make up a
structure. Examples of descriptive explanations are as follows:

1. explaining how to start a car (the steps one goes through in the process).
2. explaining the structure of an internal combustion engine (the parts and their relation to one another).
3. explaining how to plan a lesson.
4. explaining the structure of a well-written essay.
5. explaining the process of achieving a state certificate to teach in the elementary schools.

Note that none of the above require reasons to be given; they "simply require stating facts, listing steps, supplying purposes, giving relationships, specifying criteria, etc." (Ennis, p. 256). As Ennis points out, however, explaining a process such as starting a car or writing a lesson plan might well lead to reasons for doing x (the next category of explanation to be discussed) and/or explaining via some type of definition or interpretation. One must recognize the different kinds of explanation, however, if only because each has its own set of associated problems.
While many of the problems of descriptive explanations relate specifically to that which is to be described, Ennis does list some general precautions.

1. The thing to be explained should be broken up into parts by the explainer, parts which can be made clear in and of themselves.
2. The type of relationship between the parts should be settled upon by the explainer.
3. The parts should be presented in a carefully chosen order, which depends greatly upon their relationship to each other. ... 
4. Models can be used to provide clarity by use of analogous things which presumably are already clear. ... 
5. Every model has its dangers, since it is analogous, not identical, to the thing being explained. The explainer should be aware of the places where the analogy does not hold and should point out those that are not obvious. (Ennis, pp. 256-257)

As one inspects the Ennis list of precautions, a number of parallels with both Martin's necessary conditions for explanation (D) and the COI emerge. The first three precautions come very close to Martin's conditions (d) and (g), focusing on content covered and organization. The COI also stresses these features, in particular under the "provides for student assimilation/synthesis of content" factor, as well as items twenty-one ("taught the lesson step by step") and twenty-three
("presented the lesson in a logical manner"). Similar items are found in Bush et al. and Kennedy et al.

Precautions four and five seem to parallel use of examples in the "explains the content of instruction" factor and the comparing/contrasting item of the "provides for student assimilation/synthesis of content" factor, also prominent in the earlier clarity behavior lists. These items would be critical to the gap-filling elements of Martin, as well.

The section that follows presents the third and final of Ennis’s explanation categories, "reason-giving explanations". Having completed the description of 'explanation', he then moves us to criteria for evaluating those explanations.

**Reason-giving Explanations**

Just as asking for the definition of a term, or asking one to define one’s terms, is an ambiguous request, so too are many other requests for explanations. Ennis notes, as stated earlier, that asking a student to "explain the Civil War" could be a request for a description of the major events leading to the outbreak of war
(descriptive), or it could be a request for the reasons for the Civil War (reason-giving explanation). The request could be made unambiguous simply by rewording ("What are the events that led to the outbreak of the Civil War?" versus "Why, or for what reasons, did the Civil War break out when it did?"). The point here is that if one wants a reason-giving explanation, one should ask for reasons. While one might do so in a variety of ways, such as "'How do you know ...?'", 'account for', 'How is it that ...?', and 'cause'" (Ennis, p. 260), and while each of the above requests different types of reason-giving, they all call for some type of reasons.

As stated earlier in reference to Martin's use of gap-filling, when responding to requests for reasons a logically complete explanation is seldom required; the key is leaving gaps that the student can bridge successfully and accurately. That is, there is an optimal amount of information required, and it is gauging the amount of information as well as what specific bits the student needs - not much more and certainly not less - that is critical to the explanation process. In the steel mill closing example, the teacher assumes that the student
understands profit motives of corporate capitalism, and understands that closing a plant to cut losses is one industrial remedy among many for financial ills. To include all of the above would, in this case, be tantamount to informational overkill.

An objectively complete explanation is thus quite different from a subjectively satisfactory, and thereby "complete" one (Soltis makes this same point).

The point of completing explanations is to get the whole situation out in front of us for evaluation. A person who offers an explanation which is incomplete is generally obliged to defend not only the explicans, but also his answer to the question, "And what does that have to do with it?" The gap-filler is the answer to that question. If the gap-filler (or the explicans) is false or otherwise defective, then he has not offered a good explanation. (Ennis, p. 263)

If the student can not fill the gap, then the teacher/explainer must. This is the case not only with reason-giving explanations, but with any of the other categories, as well.

The use of gap-filling thus provides us with a first line of evaluation for explanations. We again need to distinguish between logical and psychological criteria of adequacy, however (our two "product" senses spoken of in earlier chapters
relative to 'clear teaching'). Ennis's point is that logically complete explanations are not ordinarily the issue. While the content must be covered accurately and in that sense, meet the logical structure condition, the amount or extent of coverage is determined by the needs of the learner and the intent of the teacher. As long as the student can supply the gap-filler, and the gap-filler supplied is correct, the explanation is adequate according to this first level of evaluation.

This notion of gap-filling, as stated earlier, is closely related to Martin and to the COI and Bush/Kennedy list. The Martin connections have been made explicitly; the COI and Bush/Kennedy connections have been made less so. The idea of explanations that lead to student understanding runs throughout the empirical clarity research - the whole focus is on bridgeable gaps. The added feature of checks on progress in the COI (items twelve through eighteen under "stresses and tries to ensure student understanding of content", especially) is obviously an attempt on the part of the teacher to assure student gap-filling. We find similar items on the Bush/Kennedy list (items 3,
15, 22, and 26, especially).

Evaluating Via Relevant Criteria

Beyond gap-filling, a second level of evaluation for reason-giving explanations is "the application of appropriate criteria" (Ennis, p. 263), not all of which apply in each explanation. According to Ennis, these criteria fall into five general areas, the first four of which apply to most reason-giving explanations. The criteria are: "(1) truth, (2) proper level of sophistication, (3) non-circularity, (4) proper function and type, and (5) testability/applicability" (Ennis, p. 263). Further, these criteria must be treated as working in conjunction with gap-filling.

The completion of an explanation which is incomplete as presented, requires that we know which of the possible gap-fillers make the explanation a poor one (so that we do not pin an implausible one on an explanation when a plausible one may reasonably be attributed to it). Thus the decision about how an explanation should be completed depends on an evaluation of possible completions. And the evaluation of an explanation ordinarily requires that it be completed. ...

What is often required is a series of successive possible completions and consequent evaluations. If the first gap-filler makes the explanation a poor one, one should cast about for a gap-filler which may be reasonably
attributed to the explanation, and which makes it a satisfactory explanation. Only after a reasonably thorough search has been made should the explanation be declared unsatisfactory. (Ennis, p. 281)

With respect to the truth criterion, it should be obvious that any explanation with a component that is false is inadequate. There are two qualifications, however. When an otherwise false gap-filler happens to be true in a specific situation, and when the gap-filler functions as a hypothesis to be tested at a later time, the explanation can still be considered adequate, if other relevant criteria are met. For example, Ennis uses a situation in which a student is asked why two angles are equal, to which the student responds, "Because they are supplementary" (p.280). Ordinarily, the gap-filler "supplementary angles are equal" is false. But, if the particular case involves two angles, one of which is a right angle, then the gap-filler is true (happens to be true) and the explanation may be deemed satisfactory (Ennis, p.282).

The second exception is based on the idea that, were the truth of all explanatory material a necessary condition for 'explanation', then any hypothesis used to explain data would be seem as
inappropriate (Ennis, pp. 282-283). With the above two exceptions, however, an explanation must satisfy the truth criterion. This is also addressed in Martin's conditions (a) and (d), and would seem to related to condition (b), as well. Neither the COI nor the Bush/Kennedy list addresses truth or accuracy directly, a shortcoming in need of attention.

In terms of the criterion of proper level of sophistication, the explainer must be acutely aware of the existing level of understanding of the learner, as well as the requisite complexity demanded by the context. For example, when talking to a six-year-old about definitions, saying simply that definitions tell us what words mean is probably sufficient. In terms of the ability of the listener, the "degree of abstraction" and the "degree of refinement of the subject matter" (Ennis, p. 287) are quite low. However, in talking with a college level class in language analysis, a discussion paralleling the more detailed account of the various categories of definition above would be closer to the appropriate level of sophistication. There is greater need for distinctions and elaborations in the latter case as compared to the
former due to the context of the discussion, the relative ability levels of the listeners, and the purposes of the teacher.

...an explanation that misgauges the level of sophistication appropriate for the audience is in that respect unsatisfactory, although sometimes it is the explanation request that is at fault. (Ennis, p. 288)

Martin's condition (c) focuses exclusively on the tutor's knowledge of the tutee's "intellectual predicament"; and conditions (d) and (e) seem equally relevant. Level of sophistication, in terms of student ability and intent of the teacher, must be addressed.

Perhaps another obvious point is made in the case of circularity. If an explanation is circular, it merely restates what is already present. One might imagine a political figure, having been asked why unemployment is so high, responding that the rate is high because large numbers of people are out of work. What is asked for is an explanation based on empirical/causal events leading to the result (high unemployment). What is provided is an analytic response in that, what we mean by 'high unemployment' is 'a lot of people being out of work'. No information, other
that this trivial language equation, is passed on. The explanation is circular.

Context and level of sophistication play important roles here, in that some circular explanations may function informatively (in non-trivial ways) and satisfactorily in some contexts and for some listeners. Ennis points out that responding to a student who asks why triangle ABC is a right triangle by saying "It has a right angle" may be truly informative and not trivially true if the student is just learning the label "right triangle" and has not yet connected it with the presence of a right angle. Thus, again, the context is key in evaluating the sufficiency or adequacy of the explanation with respect to circularity.

The fourth criterion is that the explanation serve the desired function and be of the proper type. With respect to function, and as an example, Ennis makes a distinction between "accounting for" and "justifying" (pp. 292-93). Imagine a teaching situation in which a white student, upon entering a classroom with whites sitting on one side of the room and blacks on the other, and discovering that the only available seat happened to be on the black
side, chose to sit on the window sill. After class, the teacher asked the student why he did not take the empty seat, only to receive a response such as, "I don't like sitting with them."

Upon discussing the matter the teacher discovers deep-seated racial hatred and asks the student, "Why do you feel that way?" To this question the student responds, "That's the way I was brought up." At this point, the student has explained, that is, accounted for, his feelings of hatred. He has not justified them, however, which is likely to be what the teacher was asking for. The question "Why do you feel that way?" is therefore ambiguous.

For the explanation to suffice, it must serve the appropriate purpose. If the teacher desires justification, then the student must go further than merely accounting for his feelings. Again, context goes a long way toward determining which function is appropriate.

Roughly speaking, the sign that an accounting-for explanation is desired is the indication that the thing to be explained is to be accepted as fact; and a sign that a justification explanation is desired is the indication that the explicandum needs to be shown to be true. (Ennis, pp. 295-96)
This seems to relate directly to Martin's condition (b), in that the subsidiary or underlying question will likely determine issues such as "accounting-for" versus "justifying". In addition, condition (c) seems related in that the student's predicament would appear to be an interacting variable with content and teacher intent. Other than the possibility of the feedback items (12-18) on the COI providing information relevant here, no explicit handling of this issue is found in the Hines empirical work. The Bush/Kennedy work includes no explicit handling of this evaluative condition, either.

Reason-giving explanations can be of a variety of other types, giving reasons in a wide array of categories (Ennis, Chapter 17; Green, Chapter 7). In a causal explanation, one is attempting to provide the events that lead to or cause a particular situation or state of affairs. Using Ennis, explaining that the pond froze because the air temperature dropped below zero degrees Celcius (with the gap-filler "Water freezes at zero degrees Celcius or below") is to present a causal reason-giving explanation.
An analytic explanation is provided when one responds to a situation with the appropriate law or laws of language, mathematics, or logic. In this way, we have a direct parallel to interpretive explanations discussed earlier, with the added feature that analytic explanations extend to rule governed systems other than language. Explaining that a particular figure is a parallelogram because its opposite sides are parallel to one another or that the hypotenuse of a right triangle is 5 inches because the other two sides measure 3 and 4 inches respectively and, that the hypotenuse is equal to the square root of the sum of the squares of the other two sides, is to give an analytic reason-giving explanation, as well.

According to Green (p. 156), a teleological explanation (or "reason-for-acting" explanation in Ennis's terms), is one in which the purpose or end-in-view of a particular behavior is given. Explaining that an analysis of 'explanation' is engaged in to clear up conceptual confusion, thereby paving the way for a synthesis of two divergent lines of research on teacher behavior and resultant student performance is teleological in nature.
A value/obligation explanation (Ennis, p. 328) attempts to give reasons for a particular statement of value or of obligation, that is, it attempts to justify one's position via some appeal to relevant standards, criteria, or principles. The distinction above with respect to "accounting for" and "justifying" is precisely at issue here, with justification being the appropriate mode of operation. Explaining why one must (ought to) refrain from lying (obligation) and why a particular work of art is good or bad (beyond simple preference) are examples of value/obligation explanations.

As was the case earlier, one often cannot tell exactly which type of explanation is required from the question itself. The question "Why do birds fly south for the winter?" could call for the response, "To avoid the cold weather" (teleological), or possibly, "Their instincts lead them to fly south" (causal). One must rely on context (as well as some of the other criteria discussed above) to aid in determining the appropriate type.

Martin's conditions take this into account with her focus on subsidiary questions and the
state of knowledge of the tutor with respect to the content and to the student's intellectual state.
The COI seems inadequate in this regard, due largely to selection criterion one - that items be observable to third party raters. Teacher clarity would seem dependent upon the teacher providing the right category of explanation, the kind of explanation called for by (1) the "epistemology of the situation", to use the words of MacMillan and Garrison, and (2) the intellectual predicament of the student. The Hines instrument misses this. Bush et al. and Kennedy et al. seem to address this better than does Hines, as they include items that relate to the students' intellectual state and level of understanding.

The final criterion for evaluating reason-giving explanations is testability/applicability (Ennis, Chapter 18). The criterion of testability applies to empirical statements; applicability is relevant to value and/or obligation claims. Analytic claims/explanations are not subject to either test.

Standard empirical and causal explanations, which are common in the physical and social sciences (including history), the vocational subjects, and literature, are intended to explain a
fact or generalization about the world of things, men, and events. In order to succeed at this task of explaining, they must themselves contain (explicitly or implicitly) an empirical generalization which covers the thing being explained*. This generalization may be broad or narrow, but it at least must conceivably cover more than the one case being explained - even if this coverage extends only to conceivable cases identical to the one being explained. (Ennis, p. 339)

Yet the generalization must go beyond merely covering other cases. It must also be capable of being tested; "it must exclude some conceivable cases" (Ennis, p. 339). If it accounts for everything, for all possibilities, it is untestable and theoretically useless. The notion of testability need not be a practical reality, but the test must at least be conceivable, imaginable in principle. We need to be able to consider (in fact or in principle) what would count for or against the generalization.

Ennis (p. 340) uses the generalization "If there were no air resistance, all unsupported bodies in the earth's atmosphere would fall to earth with the same acceleration" as being conceptually, but not practically testable. One can imagine "what would count as evidence for and against the generalization" (p. 340), even though
the test is impossible in fact.

Compared with the above is the generalization
"A body that is simultaneously going in two
opposite directions will alternatively appear and
disappear" (p. 340). We do not know what would
count as a body going in two directions at once; a
test is impossible not only in practice, but also
in principle, as a matter of concept.

Generalizations that are untestable usually
fall in one of two categories: "meaninglessness" or
"analyticity" (Ennis, p. 342). The above is
meaningless because we do not know what
'simultaneously going in two opposite directions'
could mean. If we did, the generalization could be
tested.

'Analyticity' refers to a claim that appears
to be empirical, when it actually functions
analytically. To say that human beings are always
motivated to act in selfish ways or due to
selfishness (example employed by Wilson, 1956, p.
64) appears to be an empirical generalization, with
clear cases of evidence for and against imaginable.
One who cheats to gain material reward versus one
who jumps on a hand grenade to save the lives of
comrades might be examples employed as such
evidence. Yet, on inspection, the offerer of the
generalization might reject the altruistic
counterexample on the grounds that the soldier did
what he wanted to do, thereby acting selfishly.
Mother Theresa is similarly selfish. It becomes
clear that an analytic claim (by 'selfish motives'
the offerer means 'all motives') is being put
forth, leading to an untestable explanation.

The "applicability" criterion relates to value
and obligation explanations.

If there are not conceivable examples and
nonexamples of that sort of thing which
is judged good (or bad), then the
explanation making use of the general
'ought' and value statements is
defective. (Ennis, p. 353)

Using an extension of the "selfish motive"
example, to say that it is wrong to act selfishly,
when in fact all possible actions are seen in terms
of selfishness, fails to pass the test because
"there are no conceivable nonexamples" (Ennis, p.
353) of acting in ways that are selfish. Since we
cannot conceive of acting against selfish motives
(in this imagined case), how can one possibly
condemn acting selfishly? If, however, we do admit
to the altruistic counterexamples, we can imagine
acting non-selfishly and the applicability
criterion is met, paving the way for evaluating and justifying acting unselfishly rather than selfishly.

It would seem that clear teaching ought to yield content that is testable and/or applicable. Again, this relates to the logical product sense of the term, a sense seemingly underemphasized in all the empirical research on clarity (but not so much in the work on "inhibitors to clarity", reviewed in Chapter II and discussed in detail in Chapter VII.

**A Final Distinction**

In summary, three general categories of explanation have been addressed: interpretive, descriptive, and reason-giving. An interpretive explanation is evaluated based upon the type of definition (interpretation) offered - descriptive/reportive, stipulative, or programmatic (with possible combinations). A descriptive explanation is good or bad to the extent that it lays bare the process or structure of that which is to be described. Specific clues for greater effectiveness are: (1) breaking that which is to be explained into clear, manageable parts; (2) showing
the relationship between/among the parts; (3) carefully sequencing the presentation of the parts; (4) providing models or analogies; and (5) being clear about the limits of the models/analogies employed.

The third general category is the reason-giving explanation. While complete explanations in a technical sense are possible, they are seldom required or given. Rather, a gap is left to be filled by the listener. Beyond appropriate gap-filling, five other criteria were listed and discussed with respect to the adequacy of reason-giving explanations. They are: truth, proper level of sophistication, noncircularity, proper function and type, and testability/applicability. These criteria allow for the assessing of reason-giving explanations.

While the above work, relying largely on the distinctions drawn by Ennis and by Scheffler, does lay out a way to assess explanations, one important element is missing. It would seem that explanations function from at least two perspectives (Soltis, Chapter 4) not stated explicitly in either Ennis or Scheffler. One perspective might be considered "objective" in that
the explanation is evaluated in terms of its
closeness to the subject matter being discussed.
The other perspective might be called "subjective",
given that the concern is whether or not the
explanation satisfies the receiver of the
explanation. The two are not necessarily mutually
exclusive, but nor are they identical. The
criteria for evaluating explanations must be looked
at, given this likelihood of differing foci. This
has been alluded to several times earlier in the
analysis. It is now time to elaborate.

Where Ennis emphasized general characteristics
of good explanations, Soltis focuses specifically
on understanding, on an analysis of "satisfying
explanations" (Soltis, p. 54). 'Understanding' can
relate to a variety of contexts and conditions, as
distinct from say 'memorizing', while including the
possibility of understanding English as a language,
but not all that is spoken/written in that language
(Soltis, pp. 55-56). We must look at the "special
contexts" in which this second, more profound sense
of understanding is desired.

When genuinely puzzled about
something, we seek understanding by
asking for an explanation. Certainly, we
can achieve an understanding of something
without asking anyone for an explanation,
but when we do ask, we indicate two things. First, we confess our lack of understanding and, second, we indicate our desire to achieve understanding. (Soltis, p. 56)

Soltis goes on to say that, even when given an explanation for something, having received that explanation is no guarantee of our understanding. First, the explanation could be flawed in terms of any of the objective conditions listed above. Second, even if the explanation is objectively sound, it might not be satisfactory in that the receiver still fails to interpret and/or incorporate what is being explained in any meaningful way.

There are, as it were, two sides to the business of explaining and understanding. The objective structure and content of any explanation may be examined and described, as may be the subjective force it carries or fails to carry for the individual who receives it. On the objective side, there are explanations that are good or bad insofar as they meet an objective standard. They may be evaluated as proper or improper in form without taking into account the psychological state of the individual. There are also good and bad explanations on the subjective side — those that provide an individual with what is necessary to achieve a state of understanding and those that do not — but these demand some consideration of their psychological force. One might suppose that an objectively correct explanation generally would produce understanding, but such is not always the case. We
might have Einstein's theory of relativity explained to us in quite proper form, and yet not understand it at all. Although the objective form of an explanation is important to our understanding, those special aspects of the form that are necessary to achieve understanding must be carefully delineated from the objective standards of a good explanation. (Soltis, p. 56)

Put differently, objective criteria regarding accuracy may be necessary, but are not sufficient, for understanding.

**Criteria for a Satisfying Explanation**

The first condition set by Soltis for a satisfying explanation is that it be of the type requested - the "relevant-type" condition (pp. 59-60). As was mentioned above, requests for explanations are often ambiguous, and for the explanation to satisfy the questioner/listener, it must literally answer the question (request for a particular type of explanation) at hand. But is this sufficient? Could one receive the relevant type of explanation and still not understand, still not be satisfied? One might, for example, ask for a causal explanation of why some teachers bring about more learning in students than do other teachers, and be told that the better teachers were
born that way. A cause is provided, but is the questioner satisfied?

Soltis next turns to the "adequacy" of the explanation, the idea "that a satisfactory explanation must be psychologically complete" (Soltis, p. 61). Note that logical completion is not required, for the reasons given above regarding gap-filling. There are two elements to psychological completeness or adequacy that must be addressed. First, a logical gap that cannot be filled by the listener will lead to an unsatisfactory explanation. Second, even when no logical gap occurs and the explanation is of the appropriate type, one can remain unsatisfied if the terminology employed is unfamiliar. In this second case, the explanation

...is inadequate because it fails to complete a psychological - not logical - connection between what the individual does not understand and what he does understand. This should indicate quite clearly that the adequacy of an explanation viewed in its subjective dimension cannot be assessed on the merits of its logical form alone, but rather must be examined in a specific context with respect to what the individual does and does not already know or understand about the event or phenomenon in question. (Soltis, p. 62)
The third condition is accuracy, or truth. But are things as simple as saying that, ceteris paribus, a true explanation is more satisfactory or will be preferred in a subjective sense over others? History tells us otherwise (Galileo, e.g.).

Truth cannot be a condition for satisfying explanations. But there is still something found in accuracy that is not found in conditions one and two, according to Soltis. Why did people dismiss the Copernican theory of the solar system? It was not because it was of the wrong explanatory type or that it had logical gaps or was framed in unfamiliar terms. The theory flew in the face of other critically important beliefs (the belief that the earth was the fixed center of the solar system, with the sun, moon, and planets revolving around it). "For such people, the theory contained a major inaccuracy, though it might be wiser with hindsight to say that it failed to be consistent with what they then believed to be true" (Soltis, p. 63).

Thus, rather than truth or accuracy as the third relevant condition for satisfying explanations, we must talk in terms of
compatibility, or being "subjectively 'accurate' in the sense that it is consistent and is compatible with, or meets the standards imposed by, the beliefs the individual already holds" (Soltis, p. 63). This third condition in no way precludes one from shifting to an explanation that is incompatible with earlier beliefs; dissonance and persuasion can play a role in modifying even core beliefs (Soltis, pp. 63-64).

If the relevant type, adequacy, and accuracy conditions as defined above have been met by an explanation, I believe we can then unequivocally say that the explanation offered will satisfy the individual. But can we now say further that, if these criteria are met, the individual has achieved understanding? (Soltis, p. 65)

This, of course, could not be the case. If it were, there would be no room for misunderstanding. Those who accepted the "earth-as-center" theory of the solar system were satisfied, but they misunderstood. While truth is not necessary for a satisfactory explanation, it is necessary for understanding. "It seems that there must be some justifiable or warranted relationship between what is claimed to be understood and what is actually the case" (Soltis, pp. 65-66).
Conceptual Outcomes of Objective Versus Subjective Criteria for Explanations

In overlaying Ennis and Scheffler with Soltis, what do we find? First, where relevant type of explanation is crucial to both objective and subjective adequacy, the other criteria seem to offer a bit more difficulty. We find that logical completeness may be helpful objectively, but it is not necessarily involved in a subjective sense, as long as the gap to be filled is managed by the listener. Truth, a condition for objective explanations, gives way to compatibility with prior beliefs subjectively. This possibility of truth conflicting with compatibility may be a problem with the "student-perceived" clarity notion in the empirical research.

Proper level of sophistication functions objectively in terms of providing the appropriate level of abstraction and precision for the situation; but in terms of subjectivity, it expands to include the familiarity of terminology and appropriate level of difficulty/sophistication with respect to the listener (in terms of the listener's interest and ability). Finally, circularity and
testibility/applicability seem more relevant to objective than to subjective criteria, yet a sophisticated receiver of an explanation might recognize the above as problems in an explanation and hence be unsatisfied.

It would appear that a teacher who wanted to be clear, to be an effective explainer, would do well to heed the above. Student perception of teacher clarity seems most related to the subjective realm of explaining. However, if the teacher's purpose is increased learning and understanding, one must go beyond merely satisfying explanations to those that are true, as well.

In terms of the COI, a few things might now be said regarding the inclusiveness of the instrument. From the work cited in Chapters V and VI dealing with the concept of 'explanation' there appears to be a difference between explaining behaviors and the checking on the progress of the explanation in terms of student understanding. The teacher, when engaging in behaviors designed to check or monitor student progress (items 12, 13, 14, and 18, especially) is not actually explaining. If these are a part of clear teaching, then 'clear teaching' outstrips 'explanation' in terms of conceptual
terrain covered.

Since the interest of the studies reviewed is on student understanding, this expansion makes sense. It is desirable to explain and to have that explanation function for the receiver. That is precisely what Martin's conditions address. But whether the explanation works can only be determined by leaving the explanatory mode and entering the feedback/appraisal mode. These two areas are what the COI covers. The same is the case for the Bush/Kennedy list of prime discriminators.

The only item on the COI and the Bush/Kennedy list that is still puzzling, because it does not fit either of these two areas, is COI item ten (and Bush/Kennedy item seventeen) - "shows students how to remember things". The most obvious function served by this item is as a review tool to insure better retention of information. This may relate to a need on the part of students to hold information in a ready access memory compartment, allowing for retrieval when needed in other parts of the lesson, perhaps as a means to synthesizing old information with new.
It could also be the case that students, seeing testing as the logical final step of any lesson sequence, tie memory gimmicks to the act of teaching clearly. It is impossible to tell which, if either, is the reason for students including the item here, although item G-9 on the Cruickshank et al. list ("tells students tricks for remembering things") would lead one to believe that the purpose is probably related to low-level memorization. To the extent that it is the latter, the COI and the Bush/Kennedy list go beyond reasonable conceptual limits by including the memory item.

As a definition of 'clear teaching', then, the COI errs both on the side of exclusivity and inclusivity. It limits teaching methods ordinarily a part of 'clear teaching' to didactic instruction or pedagogic explanation (exclusivity); and it includes conceptual material that might be best left out (inclusivity).

The Bush/Kennedy list is less exclusive in that items that relate to the students' intellectual state are given greater importance than on the COI; but, as is the case with the COI, it too limits teaching method to pedagogical explanation. The inclusion of the memory item
indicates that the Bush/Kennedy list equals the COI in terms of inclusivity.

Having completed the discussion of 'clear teaching' from a conceptual, philosophical perspective, it is now time to shift the analysis to 'inhibitors to clear teaching'. Chapter VII focuses on this analysis in an attempt to provide a foundation for integrating the two lines of empirical research.
CHAPTER SEVEN

INHIBITORS TO CLEAR TEACHING:

A PHILOSOPHICAL ANALYSIS OF THE RESEARCH

To this point in the analysis, 'clear teaching' has been approached operationally, as described in the empirical research reviewed in Chapter II, and conceptually, employing philosophical analysis in Chapters IV through VI. The conceptual treatment of 'teacher clarity' was used to evaluate the operational version, in an attempt to lay a theoretical foundation for the empirical research.

Given the conceptual work done on 'clarity' and related concepts, especially 'explanation', the analysis now moves to 'inhibitors to clarity', the second line of research emanating from the Rosenshine and Furst (1971) review highlighting clear teaching as a variable of promise for teacher effectiveness. The early "inhibitors" research focuses on "teacher vagueness" as it relates to student achievement. Later studies begin to look
at other inhibitors, as well. In other words, 'inhibitors to clarity' is the more general term, including vagueness and other inhibitors as subgroupings.

The emphasis of this chapter is on how 'vagueness' and other inhibitors to clarity are defined in the research (operationally) as compared with the use of the terms as revealed via philosophical analysis. In brief, the 'inhibitors to clarity' analysis in Chapter VII will mirror in many ways the work preceding on 'clarity'.

In the 'clarity' work, it was found that significant differences existed between the operational definition and the ordinary employment of the term. The same is hypothesized for the inhibitors to clarity, including 'vagueness' and 'ambiguity'. One additional feature will be found to be significant, however. The analysis of the operational, research use of these inhibitors to clarity and the ordinary use of the terms parallels the 'clarity' analysis. But there is a third use - that employed by philosophers and linguists, among others - that is more precise and technical than ordinary use and that will be found to be helpful in drawing distinctions between and among
inhibitors. In the "inhibitors" research, then, three and not two categories of use need to be examined.

'_Vagueness' as Employed in the Empirical Research_

The concept of 'vagueness' in the research of interest in this study is used operationally in the manner employed by Hiller et al. As such, it is seen as a "psychological construct", referring to ...

...the state of mind of a performer who does not sufficiently command the facts or the understanding required for maximally effective communication. (Hiller et al., p. 670)

'Vagueness' is viewed as "an internal stimulus condition" whose strength is revealed through the "frequency of vagueness responses" and arises as a speaker tries to present "information he can't remember or never really knew" (Hiller et al., p. 670). While the above might be the case in an empirical sense (Hiller's 1968 dissertation is cited as evidence in favor), the necessity of the above conceptually is a different matter, requiring analysis of a different sort.

To put the matter differently, thinking of 'vagueness' as an "internal stimulus condition" of
the speaker is a very limited view of the term. First, while such a condition might lead a speaker to be vague, it need not necessarily lead one to be vague. Second, vagueness can result from other sources. There may be content that simply does not admit to non-vague treatment, independent of the state of mind of the speaker. Third, vagueness is not always a problem. These and other complicating factors will be addressed as this analysis proceeds. It is important here only to point out that the Hiller et al. rendering of 'vagueness' is limited, to say the least.

This analysis begins with the operational sense of 'vagueness' as employed in the research, followed by a conceptual treatment. One key issue focuses on the necessity of memory lapses or informational misunderstanding for the existence or occurrence of vagueness. Finally, the conceptual work on 'clarity' and 'explanation' will be incorporated in an attempt at synthesis.

As a note of limitation, Hiller et al. make clear that they are looking only at the lecture aspect of teaching as a means of "communicating knowledge to the student" (p. 661). This greatly narrows the scope of teaching method, and it needs
to be kept in mind. Vagueness that might arise from another source is temporarily out of bounds.

In the Hiller et al. study, verbal fluency of the teacher had a significant positive correlation to student achievement, and vagueness a negative one. 'Vagueness' was comprised of nine categories, listed (with examples) in Table 1 (Hiller et al., Table 1b, p. 665).

These nine categories are used consistently throughout the research reviewed in the present study as the basis for operational 'vagueness'. Additional specific vagueness responses that are instances of the above nine categories and found most frequently in the lectures studied for vagueness are listed in Table 2 (Hiller et al., Table 6, p. 671).

It is evident from the start that the categories cannot be considered necessary conditions for 'vagueness'. The experimental studies use frequency of occurrence (e.g., 7.5 per minute in Land and Smith, 1979, p. 197) of any and all of the items in the categories as a criterion measure of 'vagueness'. That is, no item or category is necessary, and a specified frequency of occurrence (set somewhat arbitrarily) of the items
<table>
<thead>
<tr>
<th>Category</th>
<th>Number of items</th>
<th>Mean number occurring</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ambiguous designation</td>
<td>39</td>
<td>4.7</td>
</tr>
<tr>
<td>(all of this, and things, somewhere, other people)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Negated intensifiers</td>
<td>48</td>
<td>1.2</td>
</tr>
<tr>
<td>(Not all, not many, not very)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Approximation</td>
<td>25</td>
<td>2.3</td>
</tr>
<tr>
<td>(about as, almost, pretty much)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. &quot;Bluffing&quot; and recovery</td>
<td>27</td>
<td>8.3</td>
</tr>
<tr>
<td>(a long story short, anyway, as you all know, of course)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Error admission</td>
<td>14</td>
<td>1.3</td>
</tr>
<tr>
<td>(excuse me, not sure, maybe I made an error)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Indeterminate quantification</td>
<td>18</td>
<td>10.3</td>
</tr>
<tr>
<td>(a bunch, a couple, few, some)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Multiplicity</td>
<td>26</td>
<td>7.8</td>
</tr>
<tr>
<td>(aspects, factors, sorts, kinds)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Possibility</td>
<td>17</td>
<td>8.0</td>
</tr>
<tr>
<td>(may, might, chances are, could be)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Probability</td>
<td>19</td>
<td>2.0</td>
</tr>
<tr>
<td>(probably, sometimes, ordinarily, often, frequently)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>233</td>
<td>46.5</td>
</tr>
</tbody>
</table>
TABLE 2
Most Frequently Occurring Vagueness Responses in Combined Yugoslav and Thailand Data

<table>
<thead>
<tr>
<th>Response</th>
<th>Total Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some</td>
<td>370</td>
</tr>
<tr>
<td>Many</td>
<td>179</td>
</tr>
<tr>
<td>Of Course</td>
<td>118</td>
</tr>
<tr>
<td>Things</td>
<td>108</td>
</tr>
<tr>
<td>A Little</td>
<td>102</td>
</tr>
<tr>
<td>Might</td>
<td>96</td>
</tr>
<tr>
<td>Few</td>
<td>84</td>
</tr>
<tr>
<td>Actually</td>
<td>83</td>
</tr>
<tr>
<td>Much</td>
<td>82</td>
</tr>
<tr>
<td>Something</td>
<td>75</td>
</tr>
<tr>
<td>Probably</td>
<td>74</td>
</tr>
<tr>
<td>As Far As</td>
<td>71</td>
</tr>
<tr>
<td>Perhaps</td>
<td>64</td>
</tr>
<tr>
<td>You See</td>
<td>58</td>
</tr>
<tr>
<td>May</td>
<td>57</td>
</tr>
<tr>
<td>In Fact</td>
<td>54</td>
</tr>
<tr>
<td>Maybe</td>
<td>53</td>
</tr>
<tr>
<td>Ok</td>
<td>53</td>
</tr>
<tr>
<td>You Know</td>
<td>52</td>
</tr>
<tr>
<td>Almost</td>
<td>48</td>
</tr>
<tr>
<td>Sort of (&quot;Sorta&quot;)</td>
<td>44</td>
</tr>
<tr>
<td>Type of (&quot;Typea&quot;)</td>
<td>42</td>
</tr>
<tr>
<td>The Rest</td>
<td>39</td>
</tr>
<tr>
<td>Somewhat</td>
<td>37</td>
</tr>
<tr>
<td>Seems</td>
<td>35</td>
</tr>
<tr>
<td>Various</td>
<td>32</td>
</tr>
<tr>
<td>Kind of (&quot;Kinda&quot;)</td>
<td>31</td>
</tr>
<tr>
<td>Several</td>
<td>31</td>
</tr>
<tr>
<td>Seem</td>
<td>29</td>
</tr>
<tr>
<td>Conditions</td>
<td>29</td>
</tr>
<tr>
<td>A Certain</td>
<td>26</td>
</tr>
<tr>
<td>Not Too</td>
<td>25</td>
</tr>
<tr>
<td>In Essence</td>
<td>24</td>
</tr>
<tr>
<td>And Other</td>
<td>23</td>
</tr>
<tr>
<td>And So On</td>
<td>23</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2351</strong></td>
</tr>
</tbody>
</table>

Total of All Vagueness Responses

| Total of All Vagueness Responses | 3503 |
in the categories make up sufficient conditions for the 'vagueness' label (see Smith and Edmonds, 1978, e.g.).

It appears that the frequency of vagueness responses is seen by Hiller et al. as an indication of the confused state of mind of the speaker. The frequency of vagueness responses varies inversely with the speaker's verbal fluency and command of the subject matter. It is probably inaccurate to say that Hiller viewed "verbal fluency" as the opposite of "vagueness", but he did find the two (as factors) related significantly to student achievement - verbal fluency positively and vagueness negatively.

In the next section, other teacher behaviors seen to be inhibitors to clear presentations are discussed. These other inhibitors, combined with operational 'vagueness', make up the focus of study in this chapter.

**Other Inhibitors Studied**

Smith (1977) adds the use of "OK" as a separate category from "vagueness" terms. Smith's reasoning was based on the high frequency of
occurrence of "OK" in the lessons that he studied (1977, p. 198). Hiller's reasoning for including "OK" as a vagueness term was based on the idea that "OK" is a "term that was nervously repeated by the teachers and lent nothing to the substantive content of the lesson" (Smith, 1977, p. 198).

What is interesting is that the use of "OK" varied positively with achievement in the Smith study. While the finding was unexpected by Smith, it does fall in line with the clarity findings using the Hines instrument. Item 12 on the COI includes the teacher asking "Is that Ok?" as a positive clarity move. It would appear that the use of "OK" as it relates to achievement is context specific. If nervously repeated, then there is no reason to believe that the use of "OK" is helpful. If used as a check on understanding (e.g., "Is that OK?") then perhaps it is of benefit.

Mazes, defined as "false starts or halts in speech, redundantly stated words, and tangles of words" (Land, 1979, p. 795) are also seen as inhibitors to clarity. Smith (1977) claimed mazes to be "any unit of discourse that does not make semantic sense" (p. 199). Related to mazes in Land's eyes is the use of "uh", "ah", and "um", all
breaks in speech that Hiller et al. related negatively to "verbal fluency" (1979, p. 795).

Additional unexplained content, "extra items that were related to the lesson but were not essential to the main idea of the lesson" (Land, 1979, p. 797), is seen as another inhibitor to clarity. However, little evidence was found for this item's negative effect on achievement (Land, 1979).

Teacher discontinuities "evidenced by digressions or irrelevant interjections of subject matter", were also seen as inhibitors to clarity (Smith and Cotten, 1981, p. 670). Two types were defined.

One form of discontinuity was defined as the teacher's interruption in the flow of the lesson with an announcement irrelevant to the stimuli in the lesson. The second form of discontinuity was defined as the teacher's interjection of relevant stimuli at inappropriate times in the lesson. (p. 671)

As was the case with vagueness terms, these additional categories are related to the inhibiting of clarity by virtue of their frequency of use.

Generally speaking, lessons devoid of these inhibitors are deemed clear presentations. The higher the frequency of occurrence of the
inhibitors (singly and in combination), the more unclear the lesson (the more clarity has been inhibited). How well these low-inference indicators of 'vagueness', in combination with the other inhibitors to clear teaching, cover the conceptual terrain is yet to be addressed.

Since 'vagueness' and other inhibitors to clarity function operationally in the research as well as in ordinary language, we run into similar problems found in the discussion of 'clarity'. Additional complexity arises in that a third use, a more technical employment especially of 'ambiguity' and 'vagueness' in philosophic discourse, needs to be considered here, as well.

As was seen above, speaking in terms of necessary conditions for the inhibitors is of little use. Sufficient conditions for vagueness seem related to frequency of occurrence of the vagueness terms, but strict sufficient conditions (some absolute level of frequency, e.g.) are difficult if not impossible to pinpoint. This ought not to be surprising, given the discussion related to 'clarity' as a "range term" (Ennis) and as an "ordinary language" term as opposed to a "technical" term (Munson). If 'clarity' needs to
be viewed in ways different from strictly operational terms, so too must the inhibitors to clarity.

What might be helpful is a philosophical analysis of 'vagueness' and 'ambiguity' as inhibitors with ordinary and philosophical uses in some ways different from those employed in the research. Coupling this with looking at how well the conceptual work done on 'explanation' covers the ground occupied by the inhibitors to clarity in the research may prove useful for providing a theoretical underpinning for the "inhibitor" research. It may also serve as a means to synthesize the "inhibitors" research with the "clarity" line.

**Conceptual 'Vagueness' and 'Ambiguity'**

Scheffler, in *Beyond the Letter* (1979), addresses lapses in language, those elements of language-in-use that represent a deviation from "an ideal conception of language as utterly precise, determinate, purely literal and perfectly univocal" (p. 1). While seeing the study of idealized language as useful, Scheffler proposes that one
also look at deviations to round out our understanding of language function. His work

...attempts a direct study of lapses or deviations from the prevalent semantic ideal, its aim being to further theoretical comprehension of such "deviational" phenomena as ambiguity, vagueness, metaphor, and related aspects of language. The characterization of such features as 'deviational' is, however, relative to an ideal conception that can itself not be taken for granted. This characterization must emphatically not be taken to imply that these features are isolated, fragmentary or merely privative. On the contrary, they are pervasive, important, and deserving of systematic study in their own right. (Scheffler, 1979, pp. 1-2)

It is the purpose of this section to explore the conceptualization of inhibitors to clarity of explanation, in particular 'ambiguity' and 'vagueness', as a way to lay the foundation for a synthesis of the two primary lines of research discussed in Chapter II. While it is recognized that ambiguity and vagueness are not always to be avoided, and, in fact, represent rich resources and communicative devices, in the teaching context their use can detract from the clarity of presentation.

It might be pointed out here that such is not always the case; vagueness and ambiguity, properly used, may add to clarity in a pedagogic sense. The
most obvious example of this is the teacher pointing out that, in a particular classroom situation, clear-cut right or wrong answers are impossible. In exposing vagueness, the teacher can help the student come to know better and more clearly the content under study. Such is often the case with complex social/ethical issues.

The same might be found with respect to ambiguity. Pointing out multiple solutions to or perspectives of problems adds ambiguity, but it also increases the students' clarity of understanding of the problem being discussed. If vagueness and/or ambiguity are a part of what is being studied, pointing them out increases clarity in the logical sense, in the sense of understanding the content in all its complexity.

Munson makes the additional point that, when speaking of vagueness and/or ambiguity in the world, we need also to consider, as a prior question, what counts as linguistic vagueness and/or ambiguity.

What does it mean to say that a word, phrase, expression, or sentence is vague or ambiguous? In short, our concern is with linguistic vagueness and linguistic ambiguity. (p. 62)
That is, adopting the philosopher's stance, what is it for language to be vague or ambiguous?

**Ambiguity**

According to Green (p. 34), the terms 'vagueness' and 'ambiguity' are often used interchangeably in ordinary language. In philosophy and, one might add, in a research context, greater specificity is warranted. Green states that a term is ambiguous "if it can receive more than one meaning" (p. 34). He goes on to distinguish between "conceptual" and "contextual" ambiguity. The former might be illustrated by the word 'bat', which could mean "the stick with which one hits a baseball" as well as "those animals that fly in and around belfries". Hence, ambiguity is the case; yet, that ambiguity is likely removed when the word appears in context.

Contextual ambiguity is the case when the ambiguity persists in context, giving rise to a real barrier to understanding.

When that happens, the writer has failed to pin down his meaning, and the reader is unable to determine which of two or more different meanings is intended. Consider, for example, the statement, "Hitler's teaching was atrocious." The term "teaching" is contextually ambiguous
in this statement. The context does not tell us whether the term "teaching" refers to what was taught or to how it was taught. ...Depending upon which meaning is intended, two different claims may emerge from such a statement, claims so different in fact that we may wish to accept one as true and at the same time reject the other as false. ...It is impossible to determine the truth of such an ambiguous statement without first removing the ambiguity. (Green, p. 35)

Scheffler (1979, p. 16) makes essentially the same point employing "semantic" or "E-ambiguity" versus "psychological" or "I-ambiguity", the latter being the greater problem.

For Munson, an "expression is ambiguous when it can be understood in more than one way, and we aren't certain which way is intended" (pp. 72-73). The ambiguity can be caused by a number of things, and he discusses three of the more common causes. "Word ambiguity" (pp. 73-75) is the result of the fact that words commonly have more than one use. This case falls in line with conceptual ambiguity discussed above.

"Referential ambiguity" is the case when a term or phrase has multiple referents and the intended referent is not clear from the context (pp. 75-76). The referent to James McCord's "high White House" contact is an example of referential
ambiguity. Is the contact Nixon, Haldeman, or some other "high" official; or might it be a less high perative such as John Dean? We are not sure.

"Grammatical ambiguity" is the result of sentence structure (and often, carelessness). Due to the syntactic arrangement, one is incapable of arriving at a certain interpretation of the sentence (pp. 76-78). A sign outside a pharmacy that reads "We dispense with accuracy" is illustrative of grammatical ambiguity. This is also called "amphiboly" (Engel, pp. 52-53).

The existence of ambiguity in speech can often give rise to fallacious arguments, due to the multiple meaning of the terms used. Engel lists four types of such fallacies: amphiboly, accent, hypostatization, and equivocation (pp. 51-63). Amphiboly results primarily from poor sentence structure and is illustrated above.

The fallacy of accent occurs when "it is unclear where the stress should fall in a statement, or what tone of voice is intended (Engel, p. 54). Engel uses the example "Did you go to the store today?" as illustrative of a question having different readings depending upon where the accent is placed.
When whole sentences (or phrases) are accented by taking them out of context and highlighting them, the possibility of fallacious reading is again present. If I were to say that I liked a class, except for the teacher and the content, and then I were to be quoted by the instructor as saying "I liked the class", the instructor would be employing the fallacy of accent.

Hypostatization exists when an abstract term is regarded as though it were concrete or, more specifically, as though it had human capabilities. To say that "education must be accountable to the public" is to hypostatize. Teachers and administrators can be held accountable, but not education. Typically, no real problem exists here; we are merely speaking metaphorically. Yet there are dangers, as illustrated by the following example by Engel:

Nature produces improvements in a race by eliminating the unfit and preventing them from polluting the gene pool of the fit. Therefore it is only right for us to eliminate these unfit people. (p. 58)

"Nature" knows neither what counts as 'improvement' nor 'fit' nor 'unfit'; to endow nature with these human characteristics is to provide a powerful, yet dangerously fallacious,
rationale for social darwinism. Notions of what is 'improvement', 'fitness', and lack of 'fitness' are human concerns and in need of debate by humans. No appeal to nature will do.

Equivocation is another fallacy of ambiguity, and it has been illustrated earlier in this study. The shifting between process and product senses of 'teaching', and between the two product senses of 'clear teaching' are examples of possible equivocation. If a term shifts from one meaning to another in the middle of an argument, equivocation is at work. To the extent that the argument hangs on the shift, that argument is fallacious and misleading. Again, Engel provides a good example.

Only man is rational.
No woman is a man.
Therefore no woman is rational. (p. 59)

'Man' is first used in its generic sense, and then shifts meaning to "male gender", and that shift allows the conclusion to seem to follow.

The reason for summarizing these informal fallacies of ambiguity is to illustrate ambiguity in speech, but also to show that, if gone undetected, ambiguity will not necessarily be an inhibitor to clarity in the psychological sense. That is, while the logical clarity of the
expression is disrupted, the perception of the
listeners may not be inhibited at all. They may
perceive the message, with attendant ambiguity, as
being perfectly clear. They will also be misled.
This is another reason to consider both product
senses of 'clear teaching'.

Vagueness

In contrast to an ambiguous term or phrase, a
"vague term is usually one referring to a quality
or property that things may have in varying
degrees" (Green, p. 37). To speak of something
being large or small, high or low, is to describe
in a vague manner because "there is no rule in our
language to specify exactly how much of such a
quality a thing must have in order for the term to
apply" (Green, p. 37). How much money must one
possess to be rich? Where does the mountain begin
and, having climbed the mountain, when does one
know when the top has been reached? Vagueness
exists due to a lack of precision regarding the
bounds of use for some terms (Note 1).

Munson finds words to be vague for one of two
reasons. First, when words lack "quantitative
prescision and they are used in connection with
something we generally consider to be measurable or countable" (p. 62), we have one instance of vagueness. Describing a trip as "rather long" lacks quantitative precision in a situation that could employ measurement. A great deal depends on the context, but vagueness could be an issue if greater precision is called for. If nothing of importance hangs on the drawing of precise measures, vagueness is a non-issue.

In addition, in situations in which numerical measurement is impossible or unimportant, ordinary language can enable us "to make distinctions and introduce comparisons of various degrees of refinement" (Munson, p. 63). When asked how important it is for me to complete my degree, I could say that it is worth 5.3 importants; but that would make little sense. What I am likely to do is employ ordinary language by stating that it is "very important" or it is a "life or death" issue, or that it "matters little at this time". The issue is one of comparison, and numerical precision is impossible. To say that, lacking such precision, the above phrases are vague and thereby uninformative is to demand more than can be given (or than is needed).
One can also imagine, according to Munson, a case in which measurability is possible, but either unimportant or excessively precise. If, while walking down the street, someone asks "How far is it to the library?", I might respond, "It is 1,036.147 meters." Unless the person asking the question were someone such as a surveyor working for a land purchasing company interested in buying the street frontage from where we stood to the library, the response is overly and unnecessarily precise. A more appropriate response might be "about ten blocks" or "too far to walk". If the response is not precise enough, the questioner can press for more information. Context and discourse will work out the details, ordinarily.

There is an additional possibility of "false precision". If I were asked my weight, and I responded that I weigh exactly 171.548 pounds, I would be falsely precise because my weight fluctuates beyond the bounds of thousandths of a pound, even in as short a time span as a few hours. Again, context plays a big role (vague?) in determining appropriate levels of precision (Note 2).
All of this suggests that the need to be clear in teaching requires not that we avoid vagueness but rather that we be clear in our minds and speech about how much vagueness or precision is needed or demanded in a particular context.

"Vagueness in use" is a second way in which Munson finds words to be vague. This type involves the use of terms whose boundaries between appropriate and inappropriate use are not clearly defined. Exactly when does a person become "wealthy"? How much money must that person have? When is a person considered "bald"? There are often no clear-cut criteria for determining the appropriate use. While clear-cut examples of all of the above can be imagined, there are any number of borderline cases for which we remain puzzled.

For Munson, a word is employed in a vague manner if the following conditions are met:

1. whether or not the word applies to given cases makes a substantial (as opposed to a trivial) difference;

2. there is doubt or disagreement about whether the word applies to these cases;

3. the doubt or disagreement is not due to the need for more facts about the cases. (p. 67)
Munson seems to agree with Green and Ennis that vagueness and ambiguity are distinct, or at least distinguishable, phenomena.

Additional Concerns

The exploration of 'vagueness' and 'ambiguity' could be carried much further, and in so doing we might encounter cases difficult to handle with the information provided above (Note 3). The point is that philosophical analysis can make clear distinctions that were not clear before analysis, but that is not to say that, in the end, all will be clear. Adding to the complexity is the possibility of a term being both ambiguous and vague.

A term may be vague without being ambiguous, and it may be ambiguous without being vague. But we have no way of knowing whether an ambiguous term is vague until we first remove the ambiguity. An ambiguous term is one which has more than one sense. It may be vague in one of its senses and not in another. If, in the effort to attain clarity about an ambiguous concept, it is important to attend to its vagueness, then the first step in analysis is to remove the ambiguity. (Green, p. 37)

Once vagueness is recognized, once we realize that a term lacks precise limits for use, what are we to do? First, all vagueness is not bad; vague
terms do not lack meaning. There are usually clear cases in which the term obviously applies and does not apply. J. Paul Getty was obviously rich, and the people served by Mother Theresa obviously not rich. The existence of vagueness "...implies only that the meaning of the term does not include any rule which will specify, in every case, whether the term can apply (Green, p. 38). Vague concepts can be quite useful, and often there is not need to remove the vagueness. Only when something important (a policy decision, e.g.) hangs on the concept do we need to push for more precise limits. If bald people were to be barred from university life, those professors with receding hairlines might be interested in gaining specificity re: 'baldness'.

To solve the mystery of getting criteria, we must search the situation in which the problem of borderline cases arises. The clues lie in the answers to questions that, at first sight, seem to have no more to do with eliminating vagueness than does the size of apples in Minneapolis. Here are the questions:

1. What goal or purpose do we want to achieve that requires us to make decisions about whether a word applies?

2. What are the results of applying a proposed criterion likely to be?

3. How willing are we to accept those results? (Munson, p. 69)
Scheffler (1979) pushes the point a bit further, however. While the above treatment of 'ambiguity' and of 'vagueness' makes needed distinctions, more must be said if anything beyond superficial understanding is to be gained. A word is ambiguous if it has multiple meanings, but talking of

...meanings, senses, or ideas provide no more than the ghost of an explanation unless, as seems unlikely, they can be clearly construed as countable things whose relations to one another and to words are independently determinable. At best, such entities may be regarded as hypostatizations of the content of sets of synonymous expressions, the specification resting in the critically obscure notion of synonymy. (Scheffler, 1979, p. 11)

Having different dictionary definitions is ambiguity, but larger questions remain. Which dictionary is to be used and how has that dictionary been composed? To what extent is the reading of meanings a reflection of the "lexicographer's unanalyzed judgments of ambiguity" (Scheffler, 1979, p. 12)? In addition, we must

...ask in what the relevant difference of readings consists. The readings in question are presumably not merely different but non-synonymous; the proposed criterion of ambiguity thus presupposes, without providing an account of, the troublesome notion of synonymy. Alternatively, it may be suggested that
we consider not different actual expressions, but different abstract readings, a reading to be construed now as an entity correlated with a set of synonymous expressions; here the individuation of readings clearly hinges on synonymy, and their postulation carries us back to meanings or senses once more. (Scheffler, 1979, p. 12)

The above criterion for ambiguity of "different meanings" is insufficient also because it fails to make a clear distinction between non-synonymous readings that exhibit generality as opposed to ambiguity. Scheffler uses as an example 'caravan' meaning:

(i) A group of travelers journeying together through desert or hostile regions.
(ii) A group of vehicles traveling together in a file. (1979, p. 12)

Are these two meaning sufficient to conclude that 'caravan' is ambiguous? Or do they merely show the unambiguous generality of the term? "That a 'table' denotes big as well as little tables argues not its ambiguity but only its breadth of applicability" (Scheffler, 1979, p. 15).

"Extensional divergence", illustrated by the difference between "table of contents" and "table as furniture" does indicate ambiguity, according to Scheffler.
It may be necessary at some point to push this analysis further (Note 4). For our purposes at present, the above will suffice.

One additional point must be made regarding the nature of the "indecision" involved in a case of vagueness. That indecision can be the result of a number of conditions, each pointing to a different set of possible solutions. We can find cases of vagueness that are the result of ignorance — saying "a few" because the exact number is unknown for example. We might employ a vague term because a more precise one is impossible — determining exactly when "middle age" does and does not apply is likely to be a problem not solvable by better/more inquiry. Vagueness also results from terms having been used over long periods of time in a variety of contexts, thereby causing the loss of precise limits that once might have been present. The word 'communist' in 1848 had more precise bounds than it does today, for example.

Theoretical adequacy also might affect vagueness.

In advance of adequate theory, we may be unable to say what would constitute sufficient evidence for applying a given term; the emergence of an adequate theory may make clear for the
first time the relevance of various observations as evidence for such application. (Scheffler, 1979, p. 75)

Scheffler points out that the answer to the question of whether there is life on Mars may depend on a "wide variety of theoretical assumptions" (1979, p. 75). To determine the applicability of the term 'life', theoretical concerns need to be addressed.

According to Scheffler, then, vagueness can arise due to ignorance, intrinsic impossibility, theoretical inadequacy, and inadequate language rules ('inadequate' in that they allow for borderline cases). One would assume that combinations are likely, as well.

The notion of vagueness as purely semantic indecision seems to me misguided. Instances of indecision do not originate either wholly in deficiencies of meaning or wholly in deficiencies of fact; the very distinction here presupposed is itself philosophically deficient. Surrendering it, we remain, at each moment, with a whole variety of indecisions that vary subtly with the circumstances within which occasions for decision arise. The process of advancing inquiry often resolves such indecisions, and none should be prejudged as impervious to further investigation and resolution. Here is positive reason for holding fast to classical logic as a framework capable of accommodating, without structural alteration, any type of degree of reduction of indecision, any elimination
of ignorance. Absolute vagueness evaporates as a special category, to be replaced by a contextual counterpart signifying, in each case, a particular indecision theoretically soluble by further inquiry. (Scheffler, 1979, p. 78)

The above is sufficient for the purposes of this study — to determine whether and how philosophical treatment of relevant terminology might illuminate the conduct and interpretation of empirical research on inhibitors to clear pedagogic presentations.

Summary_and_Conclusion

The amount of terrain covered by the "inhibitors" studies is much more restricted, and better defined, than the "clarity" studies. From the beginning, the focus is made out to be those behaviors that "contribute to or interfere with effective explanation in the ordinary classroom" (Hiller et al., p.661). This lecture orientation comes directly from the Gage et al. (1968) studies and runs throughout the whole line of research. A clear presentation is consistently defined as one lacking vagueness terms (see Land, 1979, e.g.).
With this in mind, 'vagueness' is defined as "an internal stimulus condition" of the speaker, the severity of which is indicated by the frequency of verbal vagueness responses (VVRs). The absolute level of VVRs is important, but comparisons across lectures must be weighed against the relative "factual load" and "logical complexity" of the content, the "intended audience", and the "communicator's task orientation and motivation" (Hiller, 1971, pp.151-152).

This notion of absolute level of VVRs contrasts with the "clarity" studies in that the "inhibitoirs" studies rely almost exclusively on external observer evaluation and assessment of the verbal presentation. Student perception of clarity and resultant evaluations are considered as relevant and interesting variables, and were found to relate to achievement and third-party ratings, but the results are equivocal and obviously viewed by the authors as of secondary importance (see Smith and Land, 1980; Smith and Cotten, 1980; Smith, Denham, and Land, 1980; and Smith and Bramblett, 1981; e.g.).

According to Land (1979), vagueness terms seem to cause students to perceive teachers as
uncertain, which in turn leads to students feeling uncertain regarding what exactly is to be learned. Additional inhibitors to clarity such as mazes distract student attention and interfere with learning, and additional unexplained content causes students to focus on extraneous material and hence lower achievement. Put differently, vagueness affects student process variables that mediate teacher process variables and student outcomes (product variables).

Given the reliance first on lecturing/explaining and second on the effects of inhibitors to this process, the conceptual work on 'explanation' and related terms done by Martin, Ennis, Green, Munson, and Soltis should have direct bearing. With respect to Martin's necessary conditions for 'explanation(D)', it would appear that condition (b), which relates to the explainer's knowledge of the content and related issues, is of special interest. The extent to which the tutor knows the content is a basic assumption underlying the 'vagueness' notion as used in the research. Vagueness results, according to Hiller, when the performer does not command the facts sufficiently for effective communication.
Condition (c), dealing with the explainer's knowledge of the explainee's intellectual state, has to do with the "intended audience" alluded to by Hiller (pp. 151-152) as an important factor affecting the comparisons of absolute VVR levels across lectures. Depending upon the content and intent of the teacher, and depending on the level of sophistication of the audience, the absolute level of vagueness will have differential effects on achievement.

In terms of conditions (d) and (e), Martin's gap-filling conditions, vagueness would seem to result if (1) too much information is left out, leading to unbridgeable gaps, or (2) irrelevant and relevant information are mixed and difficult for the student to sort out effectively. Students unable to bridge gaps are likely to be uncertain, confused, and less likely to achieve.

Condition (g) is based on organization. According to Smith, Denham, and Land (1980), organization was the main determiner of student perception of lesson clarity (lack of vagueness). This is consistent with Martin's condition (g).

Only conditions (a) and (f) have less than direct application to the inhibitor studies. One
might speculate that this is due to the assuming that the content covered is composed of answerable questions, meeting implicitly the first of these conditions. The second, the rationality principle, is more of a pedagogic ideal and may bear little on the actual process of information transfer, the goal of much of this work.

The existence of VVRs, as well as of the other inhibitors, has direct impact on the meeting of several of Martin's conditions for 'explanation(D)'. The evaluative criteria of Ennis and of Soltis have equally direct relevance to the "inhibitors" studies.

Ennis, like Martin, employs the notion of gap-filling, but in his case for the purpose of evaluating and not defining 'explanation'. He also addresses the need for proper level of sophistication as a critical factor in good explanations, a notion directly related to Hiller's (1971) concern for the "intended audience". It is the case that a lecture carried on at too high a level would appear unclear to the receiver. Inappropriate level of sophistication might then be seen as an inhibitor to clear presentations.
Truth, circularity, proper function and type, and testability/applicability, Ennis's other criteria, certainly affect the transaction; but how they act to inhibit clarity is complex. They refer more to the logical aspect of explanation than the psychological, and as such have direct bearing on the adequacy of the explanation in an objective sense. The extent to which this affects the perceiver (student or third party observer) is context-specific and variable.

The point is that much of what has been discussed thus far regarding the conditions for 'explanation' and the criteria for evaluating explanations relates to the "inhibitor" research. Such ought to be the case, as the research focuses explicitly on clear versus unclear verbal presentations (lectures).

One can easily extend this to Soltis's work on "satisfying" explanations. If a lecture is seen as being of the type asked for (relevant type), is psychologically complete, and is compatible with one's prior belief system, then clarity is much more likely than if any of these elements are missing. From both product senses of clear teaching, then, the work on 'explanation' seems to
cover quite well the notion of 'inhibitors' to clarity. To the extent that one's verbal behavior negatively affects the logical and/or psychological integrity of discourse, the observer (or student) is likely to perceive the discourse as lacking clarity. This, along with the effect of these inhibitors on achievement, is the underlying theme of the "inhibitor" research.

What is less obvious than the above work is the connection between the "inhibitor" research and the conceptual work on 'vagueness' and 'ambiguity'. While much of the Martin, Ennis, and Soltis work is supportive, the latter is less so. We need to look at what counts as 'vagueness' and 'ambiguity', as prior questions or questions of concept, to determine relevant connections and/or disjunctions between empirical and philosophical treatments of inhibitors to clarity.

As stated in the earlier parts of this chapter, 'vagueness' and 'ambiguity' are best treated as separate notions, even though the public often uses them interchangeably. The reason for this desired separation is that they present different problems to the receiver of the communication. The way in which each tends to
inhibit clarity is different.

In the case of 'vagueness', the receiver is unclear as to the precise bounds of the term(s) at issue. With 'ambiguity', boundaries are not the problem, multiplicity of possibilities is. There are a number of possible uses, each of which may be quite precise and discrete. The hearer is simply unable to determine which use is intended. While it is true that both vagueness and ambiguity may be present simultaneously in the same term, that is still no reason to use the two interchangeably. They do not always occur together.

If one examines Table 1 (Hill & al., Table IB, p.665), composed of categories of vagueness responses, it is obvious that the linguistic distinction between terms is not employed. The first category is "ambiguous designation". Further, out of context, it is difficult to see that the examples employed are necessarily cases of ambiguity (or even problems of communication). To say "all of this" when one means all, and when the referent to "this" is clear, is neither a case of ambiguity nor an inhibitor to clear communication.

While categories 2,3,6,7,8, and 9 do seem to be cases of vagueness (again, context would be
helpful), there are problems. For example, "multiplicity" is misleading in that, as a label, it would indicate something like ambiguity (multiple possibilities). Some of the illustrations ("aspects", "factors", e.g.) employed seem most likely to be cases of ambiguity, as well. If the question is "Which aspects or factors?", then we do have ambiguity and not vagueness. If, however, the puzzlement results from what is to count as a factor or aspect, then vagueness is likely to be the issue. Two things are important here. First, the two present quite different problems for the receiver of the presentation, and second, neither is necessarily an inhibitor to clear presentation.

The last point to be made here about the Hiller et al. categories is that two (4 and 5) seem to be neither ambiguity nor vagueness. To bluff and recover, or to admit the possibility of error, may be evasive or slippery, but not vague or ambiguous. One might add that to admit uncertainty, when one is uncertain, may be wholly appropriate and helpful to the receiver of the communication. The hearer could be misled by a too clear rendering of a vague or ambiguous state of affairs, resulting in violence done to the logical
product sense of clear teaching.

If one examines Table 2 (Hiller et al., Table 6, p. 671), the most frequently used vagueness responses, it is easy to see the same problems as illustrated with the categories. It is puzzling how saying "of course", "actually", "you see", "ok", or "in essence" (to name a few — vagueness??) leads to vagueness or ambiguity. Further, it is not clear why these phrases are necessarily a problem.

Since the other inhibitors used in the research (mazes, "um", "uh", "ok", unexplained content, and so on) have no real bearing on vagueness or ambiguity, they need not be addressed here. Their place as inhibitors to clarity was discussed earlier in this summary and, with the exception of "ok", seem justified.

A number of problems, then, seem to fall out of this analysis, related primarily to the notion of ‘vagueness’ and ‘ambiguity’ as employed in the research. First, ‘vagueness’ and ‘ambiguity’ are elided and they ought not to be. If they do cause problems for the student, those problems are different from one another and should be examined separately. Second, depending on context, they may
cause no logical problem at all.

If, for instance, a vague or approximate answer is all that is really required ("How far is it to the bookstore?"), then no real problem is presented by a vague answer ("About four blocks."). In cases in which measurement or precision is impossible, ordinary language and context allow us to employ technically vague terms with no practical problems of interpretation ("How important is this to you?"). In fact, forcing precision in such cases, or in others in which measurement is possible but absolute precision impossible ("How tall are you?") is misleading. Again, the hearer is not given an accurate picture of the state of affairs regarding the subject matter, violating the logical product sense of clear teaching.

This last point is worthy of further treatment. If teachers are told that to be imprecise is to inhibit the clarity of their presentation (and that is bad), then what effect might there be in the handling of subject matter in classrooms? Teachers may begin to look more carefully at what they say and how they say it, leading to greater precision and likely benefits in terms of student outcomes. This is especially the
case in areas in which subject matter precision is possible.

What happens in areas of pedagogic discourse in which such precision is not only not possible, but not desirable because it is misleading? For instance, to pose moral dilemmas over abortion or premarital sex as fitting neat, right or wrong, categories may increase the precision of boundaries as perceived by the student (the psychological product sense of 'clarity'), but in the end it may lead to an inaccurate and less well-developed view of the world. Clarity for clarity's sake is not what teachers ought to be after. Clarity in a psychological sense gained at the expense of an accurate, logical rendering of content may be too great a price to pay.

As was the case with the treatment of the clarity research, the desired outcomes go a long way to determining how much precision is desirable in a presentation. It should be obvious by now that the same comment is relevant to the issue of vagueness/inhibitors to clarity. Criterion-reference testing over low-level tasks is aided by clarity. Higher-level tasks may also be aided, in different ways, by clear presentations.
But it is likely that, with these higher level cognitive goals (critical thinking, skills of inquiry, and the like), something akin to "episodic clarity" might be more suitable. If the teacher "does all the work", the student may be robbed of the intellectual effort needed to come to grips with complex matters in any meaningful way. Dissonance and incoherence can be motivators to intellectual work and later coherence (clarity). Dewey, among others, saw this quite clearly.

A third possibility, illustrated by fallacies of ambiguity, is that actual logical problems exist in a message but are not recognized by the student. In a psychological sense, the ambiguity is not an inhibitor, but in a logical sense it is (content is distorted). Teachers, it would appear, need to be aware of the employment of informal fallacies in texts and in their own teaching.

In summary, then, the empirical work on "inhibitors to clarity" is much more narrowly bounded from the start than is the work on "teacher clarity". The "inhibitor" work focuses exclusively and openly on clear versus unclear presentations. In fact, the clarity work was found to be similarly limited, but that admission was not a part of the
delimitations of the studies. It fell out of the conceptual work done here.

In addition, many of the same problems found with the clarity work present themselves in the inhibitor work. There is a great deal of terminological confusion. This is due in part to the movement from operational (research) definitions to ordinary use to philosophic use. But much of that confusion is still avoidable. There is nothing inherently wrong, for example, with stipulating that 'ambiguity' will be used as a part of 'vagueness' if there are good reasons to do so and if no relative harm is done in the process. In fact, there is no good reason to do so; and harm is done in that first, the two present quite different problems to students and second, the readers of the research do not know when 'vagueness' and 'ambiguity' mean one and the same thing as opposed to two separate things.

The operational/ordinary/philosophic use problem might be extended a bit more, as it was in the clarity research. If, in the research context, words are used in a stipulative manner and are used so consistently, no problem need result. In fact, there are obvious advantages to such employment.
However, when the move is made from the research context to the public consumption of that research, confusion is likely. One is puzzled because if conditions of use vary and the same concept label is employed, one cannot be sure which sense of the term is intended (ambiguity results).

Beyond puzzlement, and perhaps a greater danger, is the possibility that puzzlement will not result. If the research is blindly applied to practice, without caveats regarding terminological equivocation and differential effects dependent upon choice of outcomes intended and purposes for teaching particular content, then teachers as a result of the training they receive could engage in miseducative endeavors. The examples of forcing complex issues into clear but mistakenly dualistic terms discussed earlier could be reiterated here.

If research is to improve practice, that research needs to be conceptualized and worked into an overall theory of teaching and teacher education. Without conceptualizing the research, it is much more likely that it will be either ignored or, perhaps worse, employed piecemeal and mechanistically.
(1) Distinctions between 'vagueness' and 'ambiguity' are not always easy to make. Scheffler, in reference to two types of ambiguity (E-ambiguity and I-ambiguity) finds one clearly distinct from 'vagueness', while the other is less so. A term can be extensionally divergent (E-ambiguous) and not vague, as well as vague and not extensionally divergent.

With I-ambiguity, things are more complex. A term is I-ambiguous when context fails to determine the alignment of a term to one of its multiple extensions or meanings (similar to Green's "contextual" ambiguity). Since 'vagueness' also seems to involve such indecision, Scheffler sees I-ambiguity as a special case of 'vagueness'. (For his argument, see Scheffler, 1979, p. 38.) While Scheffler does show that clear-cut distinctions between 'ambiguity' and 'vagueness' in all their forms are difficult to make, it is still the case that the terms denote different phenomena. Philosophical analysis can make clear distinctions where there had been none previously, but that is not to say that, pushed far enough, murkiness will
not return in a different form.

(2) 'Vagueness' is to be considered as being conceptually different from 'generality' and 'precision'. A general term is not, by nature, more vague than a less general term. The critical feature is the precision with which the bounds of the term are drawn, independent of the breadth of those bounds (Scheffler, 1979, p. 41).

Further, 'vagueness' is not to be equated with lack of 'precision'. One sense of 'precision' is considered in assessing vagueness - the precision with which the bounds of the term are drawn. But 'precision' generally construed is independent of 'vagueness'. A term that is global (hence imprecise) can still have very clearly defined bounds for use.

...'living thing' is more general than 'tree'; to call something 'a living thing' affords a less specific or precise description of it than calling it 'a tree'. Yet, the more precise term may also be the more vague. Every object within some particular domain, as we have earlier seen, may be clearly decidable as being a living thing or not, whereas some objects in the domain may not be clearly decidable as being trees or not. (Scheffler, 1979, p. 41)
It may even be the case that increasing the precision of terms increases vagueness, in that the finer the distinctions drawn, the greater the likelihood (in some situations) that there are going to be indeterminable cases. Scheffler's example of adding intermediary colors to the red, green, and blue array, thereby increasing the "precision of our color vocabulary", may in fact lead to more and not less indeterminacy of application of those more precise color names (Scheffler, 1979, pp. 41-42).

(3) For example, we also run into situations in which, according to Scheffler, neither E- nor I- ambiguity suffice. Suppose that the problem is not the recognizing and choosing between/among multiple meanings or extensions, but rather the ability to hold on to multiple meanings simultaneously. Where context is insufficient to specify the appropriate meaning/extension in I-ambiguity, in M-ambiguity (simultaneous multiple extensions) the token "appears to have simultaneously different extensions" (Scheffler, 1979, p. 17). Further, communication is not interfered with in any way here (as opposed to I-ambiguity); the purpose of
the utterance is to convey multiple meaning.

Puns provide the clearest illustration, although the phenomenon is much more general and is basic in poetry. Quine's sample sentence,

Our mothers bore us,

which he treats as exemplifying I-ambiguity, is more naturally taken as a case of M-ambiguity, for the word 'bore' is a pun, denoting both bores and bearers (ignoring tense, for simplicity's sake). The pun requires both references; it is not a matter of deciding upon the unique intended reference. (Scheffler, 1979, pp. 17-18)

(4) The problems of 'ambiguity' and 'vagueness' are far more complex than illustrated here. Scheffler goes on to discuss more exceptions to the general cases of ambiguity and vagueness related above, and for a more detailed analysis, Chapters One (for 'ambiguity') and Two (for 'vagueness') of Beyond the Letter are recommended. What is important here is that Scheffler claims that one can overcome a number of the problems associated with reliance on "meanings" or "readings" with a "nominalistic approach". In addition, one can point to differences between and among 'vagueness', 'ambiguity', and 'generality'.

Scheffler also gives a theoretical underpinning for the claims of ambiguity made in
the section on 'explanation'. Specifically, to claim that asking for an explanation is ambiguous, what we now see is that the question is I-ambiguous, with the listener unable to determine which type of explanation (interpretive, descriptive, or reason-giving) is desired. In parallel fashion, asking one to define one's terms is also I-ambiguous, given at least three different definitional options, with additional combinations possible.
CHAPTER EIGHT

SUMMARY AND DISCUSSION

As a summary statement, and as a lead-in to the discussion of the conduct of the lines of inquiry that form the content for the philosophical analysis presented in Chapters IV through VII, each research question from chapter one is addressed here.

Research Questions Addressed

1. **How is 'teacher clarity' defined and used within the present research program?**

   This can be answered most concisely by referring to the four primary studies discussed in Chapter IV, yielding three lists of teacher behaviors that serve at varying times and for varying purposes as operational 'teacher clarity'. The first, a list of 110 teacher behaviors grouped in thirteen categories, comes out of the Cruickshank et al. (1975) study, the genesis of
this entire line of research.

The second list resulted from the Bush et al. (1977) work and was refined and extended by Kennedy et al. (1978). The product of these two studies is a list of twenty-eight "prime discriminators" of teacher clarity.

The most recent list generated, and the only one to be formulated into a third-party teacher clarity assessment instrument comes out of the Hines (1981) work. Her COI is the list used most frequently by present researchers. All three lists are found in their entirety in Appendices A through C and are discussed in Chapter IV. They will also be employed in Tables 3 through 5 later in this chapter to assess the relationship between operational 'clarity' and philosophical work on 'explanation'.

2. **How is 'teacher clarity' ordinarily used by informed speakers of the language?**

'Clear teaching' is first a subset of 'teaching' generally construed. As stated in Chapter IV, any case of teaching involves, minimally, a teacher engaging a pupil in some content, with the intent to produce learning
'Clear teaching' adds to this set of conditions the need for particular outcomes. That is, while 'teaching' can be spoken of as having intended results (task sense of the term), 'clear teaching' must have particular results (achievement or product sense). This product requirement was found to be of two possible types. One is that the clear teacher succeeds in relaying content accurately, completely, and correctly. That is, a logical clarity criterion based on fidelity to content is set and the teacher's performance is judged against this criterion. The "inhibitor" research in some ways employed such a criterion.

The second type, and the one employed by the clarity studies, is that clarity of understanding be gained by the pupils. This "student perceived clarity" meets a psychological, but not necessarily the logical, criterion.

It would appear then, that 'clear teaching' conceptually is any case of teaching that results in one or the other (or both) of the product senses discussed above. Because of these different outcome senses of 'clear teaching', ambiguity and equivocation is always a possibility. As an
additional point, and as a recommendation for further clarity study, it seems that **both** product senses are desirable and ought to be addressed by teachers. In this regard, instruments that aim at assessing a teacher's clarity ought to include items that represent both outcomes.

The "inhibitor" research focuses in some ways on the logical aspects (in terms of the actual use of vagueness and other inhibitors to clarity) with little or no emphasis on the psychological, and the Hines and the Bush/Kennedy work do the opposite. Each could be informed by the other, and both might be improved by increased attention to the conceptual treatment of relevant terms found in Chapters IV through VII of this study.

3. **How, if at all, do these two uses differ?**

The primary differences between operational and conceptual 'clarity' seem to be the scope of teaching methods allowable by the construct and the range of outcomes represented. Teacher clarity in the COI and in the Bush/Kennedy research relies primarily on lecture-type, expository teaching. Clear teaching in a conceptual sense can be achieved in other ways.
The artist demonstrating brush strokes to a pupil, for instance, can be a case of teaching clearly and not be a case of explaining. We can imagine instances of 'clear teaching', devoid of explaining behaviors, without distorting the basic teaching paradigm of someone engaging someone else in some content in order to bring about learning.

While conceptual 'clear teaching' allows for this possibility, operational 'clear teaching' in Bush/Kennedy and in Hines does not. In both lists the teacher is most obviously a lecturer/explainer.

With respect to outcomes, the second major difference between operational and conceptual 'clarity', operational clarity is of the student-perceived, psychological type. 'Clear teaching' conceptually would involve psychological as well as logical clarity. Both product senses are involved conceptually, with only one represented in the empirical 'clarity' work.

4. *Of what significance is the difference?*

The significance of the above is that, first, teachers can teach clearly using methods other than the lecture, and the clarity assessment instrument most widely employed (the COI) misses this point.
In addition, supplementing this instrument with the eliminated items from the Bush/Kennedy list will not help in this regard. Put differently, 'clear teaching' as operationally defined by Hines and by Bush et al. and Kennedy et al. seems to focus on clear lecture presentations.

A second point is that once clear teaching is defined as the Hines array (or the Bush/Kennedy array), and assuming that clear teaching is deemed desirable, teachers may be encouraged, indeed taught, to teach in a manner consonant with the Hines array of behaviors. This could be done to the exclusion of other potentially effective, even preferable, ways of teaching particular content (for specific desired outcomes).

If the content to be taught and the desired results are in line with the method represented by the Hines array, no problem ensues. To the extent that content and/or intended results are not in line with such a method, the implicit restriction on method is troublesome.

Third, since there is variability in definition across even the operational definitions, one must be wary of equivocation given that 'clarity' as defined by one instrument or array is
different from 'clarity' employing another.

As an illustration of support for the claim that operational clarity limits method to explaining or lecturing, consider the following tables. In them, the various groupings and items of the Cruickshank et al. behaviors, the Bush/Kennedy prime discriminators, and the Hines COI are crossed with the conditions and criteria for 'explanation' in the philosophical literature presented in Chapters IV through VI. The purpose is to illustrate how much of operational 'clarity' is covered by 'explanation'. In so doing the claim that method is restricted to pedagogical explanation is underlined, and the focus on 'explanation' as a related concept to 'clear teaching' is justified further.

Upon inspecting the three tables, a number of things might be said regarding the overlap between the operational definitions of 'clear teaching' and the philosophical work done on 'pedagogical explanation'. (For the sake of brevity, and because the Cruickshank et al. array is the least statistically reliable, it will not be discussed directly here, although it is included in the tables.) The first area addressed is the Martin
work on necessary conditions for 'explaining' (Table 3). All conditions are addressed by the Bush/Kennedy array and the COI except the first and the third. The first, that the content admit of a true explanation, must be assumed by anyone attempting to teach, therefore it is not surprising that it is overlooked in any attempt designed to measure clear teaching.

The failure to address directly the third condition, that the explainer/teacher know or assume to know the intellectual predicament of the learner, is a bit more troublesome. It appears that in terms of the COI and the Bush/Kennedy array, the teacher need not know the learner's state of puzzlement, its nature or even its existence. Rather, teachers seem to assume the learners need or want to hear about the subject matter at hand. It would seem advisable that teachers be assessed on their ability at pinpointing student puzzlement and/or creating a state of puzzlement or dissonance to act as a motivator for the student to receive the explanation.

As Martin points out, 'explaining' implies a receptive audience. One does not explain that
<table>
<thead>
<tr>
<th>A. underlying question admits of a right answer</th>
<th>None</th>
<th>None</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. tutor understands content and related issues</td>
<td>None</td>
<td>explicitly several implicitly (e.g., 5, 10, 13, 15, 16, 21, 23, 24, 29)</td>
<td>None</td>
</tr>
<tr>
<td>C. tutor's knowledge of tutee's rational predicament</td>
<td>Implicit in I</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>D. and E. Martin's gap-filling conditions (for details see Chap. V)</td>
<td>B, G, I, J, K, L</td>
<td>1, 2, 4, 5, 7, 8, 9, 10, 13, 15, 16, 18, 19, 20, 21, 23, 24, 25, 28, 29</td>
<td>1, 3, 4, 5, 6, 7, 8, 9, 11, 16, 17, 19, 20, 21, 22, 23, 24, 25, 26, 27, 29</td>
</tr>
<tr>
<td>F. tutor allows tutee to exercise reason (rationality conditions)</td>
<td>None</td>
<td>15, 22</td>
<td>15, 17, 19</td>
</tr>
<tr>
<td>G. tutor organizes content for presentation</td>
<td>B, I</td>
<td>1, 4, 7, 10, 12, 18, 21, 22, 23, 24, 25, 29</td>
<td>1, 3, 5, 6, 7, 8, 9, 16, 20, 21, 23, 25, 26, 27</td>
</tr>
</tbody>
</table>

TABLE 3

Table of Clarity Items Crossed with Martin's Conditions for 'Explanation'
which is not puzzling. The same might be said of teaching. If there is nothing new to be learned, no questions to be answered, then one might question whether teaching is actually taking place. From Martin’s work, then, ‘clear teaching’ would appear to require (as does ‘explaining’) an audience in fact. The teacher/explainer cannot simply assume that the audience is in a rational predicament with respect to the subject matter, or that all students will have the same rational predicament. Further, we might even want to assess the teacher’s ability to generate a predicament when there ought to be one (MacMillan and Garrison, 1983). In so doing, one leaves the domain of clarity momentarily for the purpose of arousing dissonance, so that clarity might be achieved at a deeper level than before (episodic clarity).

The next table (Table 4) summarizes the overlap between Ennis’s criteria for evaluating the objective or logical quality of an explanation. It is obvious, as was the case with Martin, that the notion of gap-filling is heavily involved in both the Bush/Kennedy and the Hines arrays. With respect to the second level of evaluation, of the five criteria mentioned only one (proper level of
### TABLE 4

Table of Clarity Items Crossed with Ennis’s Criteria for Evaluating Explanations

<table>
<thead>
<tr>
<th>Ennis’ Criteria</th>
<th>Cruickshank et al.</th>
<th>Bush/Kennedy</th>
<th>Hines Prime Discrim.</th>
<th>COI</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. gap-filling</td>
<td>B, G, I</td>
<td>1, 2, 4, 5, 7, 8</td>
<td>1, 3, 4, 5, 6</td>
<td></td>
</tr>
<tr>
<td>(for details</td>
<td>J, K, L</td>
<td>9, 10, 13, 15</td>
<td>7, 8, 9, 11</td>
<td></td>
</tr>
<tr>
<td>see Chap. VI)</td>
<td></td>
<td>16, 18, 19, 20</td>
<td>16, 17, 19,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>21, 23, 24, 25</td>
<td>20, 21, 22, 23, 26</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>28, 29</td>
<td>24, 26, 27, 29</td>
<td></td>
</tr>
<tr>
<td>B. truth condition</td>
<td>None</td>
<td>None</td>
<td>implicit in</td>
<td>19, 20, 26</td>
</tr>
<tr>
<td>C. proper level of sophistication</td>
<td>I, K</td>
<td>1, 2, 3, 6, 9, 18, 19, 20</td>
<td>7, 12, 15, 16, 17, 19, 20, 22, 26, 27, 28</td>
<td></td>
</tr>
<tr>
<td>D. non-circularity</td>
<td>None</td>
<td>None</td>
<td>implicit in</td>
<td>19, 20, 26</td>
</tr>
<tr>
<td>E. proper function and type</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>F. testability or applicability</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>
sophistication) is well-represented on the instruments. Truth, non-circularity, proper function and type, and testability/applicability go virtually unrepresented.

This is not a surprising outcome, given the focus on student perceived (subjective) clarity rather than objective clarity (fidelity to the content). What appears advisable, however, to the extent that both product senses of 'clear teaching' are valued, is that one assess both the perceived clarity and the logical clarity/accuracy of the presentation. The COI and the Bush/Kennedy arrays are wanting in this latter area.

The final set of assessment criteria is that of Soltis for psychologically complete or satisfying explanations (Table 5). One problem with the first criterion (relevant-type) is that it is assumed that the receiver of an explanation requests one in the first place. While that is logically true (with the "epistemological ought" caveat of MacMillan and Garrison) of explanation and, I think teaching, the Bush/Kennedy and the Hines lists do not address this area explicitly beyond the two Hines items shown. It would seem that, for an explanation to be satisfying (and
TABLE 5
Table of Clarity Items Crossed with Soltis's Criteria for Evaluating Explanations

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A. relevant type (type requested)</td>
<td>None</td>
<td>None</td>
<td>19,20</td>
</tr>
<tr>
<td>B. adequacy (like gap-filling for Martin and for Ennis)</td>
<td>B, G, I, J, K, L</td>
<td>1, 2, 4, 5, 7, 8, 9, 10, 13, 15, 16, 18, 19, 20, 21, 23, 24, 25, 26, 28, 29</td>
<td>1, 3, 4, 5, 6, 7, 8, 9, 11, 16, 17, 19, 20, 21, 22, 23, 24, 26, 27, 29</td>
</tr>
<tr>
<td>C. truth or compatibility</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>
meaningful), it should both be asked for and be of the relevant type.

The adequacy criterion is very much like gap-filling in the earlier two tables, and it draws the same array of items from each list. While compatibility/truth is hinted at in the COI (as was "type requested"), it gets much less emphasis than Soltis would lead one to believe is necessary. Perhaps teachers need to be less concerned with the existing belief systems of pupils than was Galileo of his contemporaries, but I doubt it.

Of the items not addressed by any of the conditions or criteria (Bush/Kennedy numbers 14 and 17; Hines numbers 2, 10, 13, 14, and 18), several are tied to strategies designed to check the adequacy of the explanation given. "Gives enough time for practice" (Bush/Kennedy number 14), as well as COI items 13, 14, and 18 are directly related to feedback from student performance that might be used to modify/elaborate on the explanation already given. Item 2 on the COI ("repeats things that are important") could easily be included in the gap-filling notion employed on all three systems of conditions or criteria.
The only two items that present a problem are item 10 of the COI and item 17 of the Bush/Kennedy array, both of which relate to the teacher showing students "how to remember things". As was stated earlier, it is likely that students include this item as a test-taking aid more than as a behavior of clear teaching.

The arrays of items that make up the dominant operational definitions of 'clear teaching', then, focus mainly on explaining behavior coupled with attempts at checking on the progress of that explaining with respect to student understanding. The only exception ("shows students how to remember") would best be dropped, as it is representative of confusion between teaching or having been taught a lesson as opposed to how to recall information for a test via some memory gimmick.

The two are quite independent of one another. If "shows us how to remember things" is seen not as a memory trick but rather as a means to deeper understanding and integration/synthesis of subject matter, then it is best subsumed by other instrument items already addressed by 'explanation' (e.g., number 29 of Bush/Kennedy or number 9 of
the COI) to avoid confusion. The item, therefore, is either irrelevant (as a memory gimmick) or redundant.

Tables 3, 4, and 5 further corroborate claims made earlier in the analysis that operational 'teacher clarity' restricts teaching method to explaining, supplemented with behaviors designed to check on the adequacy of the explanation. After this rather long response to research question number four, it is now time to move on to the rest. The next four questions relate directly to the "inhibitor" research.

5. How is the phrase 'inhibitors to clarity' (including 'vagueness' and ambiguity') used in the research?

As found in the empirical research discussed in Chapter VII, the primary inhibitor to clarity in the empirical work is "vagueness", as employed by Hiller et al. Included in this category are cases of 'ambiguity' as well as other teacher behaviors seen by Hiller et al. to be cases of 'vagueness'. The conceptual inappropriateness of this manner of grouping has already been addressed in Chapter VII.
Other inhibitors listed in later studies are: the use of "OK", mazes, additional unexplained content, and teacher discontinuities. These are discussed in detail in the literature review and again in Chapter VII. "Vagueness" as employed by Hiller et al., coupled with the above four classes of additional inhibitors, make up the operational list of behaviors categorized as "inhibitors to clarity".

6. Does 'inhibitors to clarity' (including 'vagueness' and 'ambiguity') have other philosophical and/or ordinary uses?

As was found in Chapter VII, the meaning of 'inhibitors to clarity' is rather obvious, independent of the perspective. The question really becomes: What are those inhibitors and how are they used/described? The most prominent are vagueness and ambiguity.

In terms of ordinary language, 'vagueness' and 'ambiguity' are often used interchangeably (Green, 1971). In the research context, 'vagueness' was used in an extremely restricted and, in some ways, inappropriate manner. It was viewed as a "psychological construct" related to a speaker who
is not in command of the subject matter to be conveyed. While some vagueness may result from such a situation, to view 'vagueness' only in this way is a bit puzzling. This has been addressed in greater detail in Chapter VII.

'Ambiguity' is seen as one type or as a part of 'vagueness'. While Scheffler (1979) does give some justification for this in a very limited sense, to view 'ambiguity' generally as a subset of 'vagueness' is not supportable (Green, Munson).

In a philosophical, linguistic analysis, 'vagueness' and 'ambiguity' are quite different and distinguishable, and 'ambiguity' is not a mere subset of 'vagueness'. With the caveats of oversimplification from Chapter VII recognized, especially as pointed out by Scheffler (1979), we can distinguish between the two terms. 'Vagueness' generally involves an indeterminacy of application; a term's bounds for use are not clearly defined.

In the case of 'ambiguity', the problem is not imprecise bounds, but rather multiple meanings. The puzzlement arises out of the inability of the listener to pick which meaning is intended.
7. **How do these differ?**

The difference between operational (research) use of the terms, ordinary use, and philosophical use is relatively simple. In the research context, ‘ambiguity’ has been stipulated to be a part of ‘vagueness’, which is seen as a "psychological construct" representative of an unsure speaker. The ordinary use is close to this, with the two viewed as more nearly synonymous with one another. In addition, the use of ‘vagueness’ in ordinary language goes beyond the "psychological construct" notion found in the research.

Both of these are in contrast to the philosophic use, however, which makes relatively sharp distinctions between the two. One might add that others in addition to philosophers (linguists and English teachers, e.g.) also make distinctions between the terms, and for good reason.

8. **Of what significance is the difference?**

As was the case with terminological use in the clarity research, there is nothing inherently wrong with operational definitions (stipulations) as long as the stipulation is recognized. Since ordinary use of these inhibitors to clarity generally
parallels much of the operational use, we even have less of a problem than was the case with the clarity research. Why, then, need we even look at the philosophical distinctions?

The reason is that ambiguity and vagueness present different problems to the student; the teacher who is vague is unclear for reasons different from the teacher who is ambiguous. In addition, it is not the case that vagueness and ambiguity are always problems. The inhibitor research would have us believe that they are.

If nothing of importance hangs on the vagueness and/or ambiguity, then no real problem exists. In addition, it may be that vagueness and ambiguity, properly used, can enhance a teaching episode. It is at this point that the dual product sense of 'clear teaching' enters again.

In the psychological sense, vagueness and ambiguity may yield confusion, thereby inhibiting psychological clarity. That, according to the inhibitor research, is bad. That is only the case, however, if the content is not vague or ambiguous. Put differently, if what is being studied is characterized by vagueness and/or ambiguity (as is the case with many important human problems and
issues), then one must transmit that vagueness and/or ambiguity to give a true, logically clear rendering of the material. The logical and the psychological are temporarily in conflict.

At this point the teacher must help the student "make sense" of the content. Once this is done, once the teacher has addressed the "intellectual predicament" of the student and answers the questions that students "epistemologically ought" to ask (MacMillan and Garrison, 1983), a clearer understanding of the content (including its ambiguity and vagueness) is possible. Again we see the need for Dewey's blend of the psychological and the logical; the teacher's task is that of "psychologizing" the content for the student (1902).

Another possibility exists and has been addressed at length in Chapter VII. It could be the case that ambiguity and/or vagueness in a teacher's presentation could go undetected by the student (fallacies of ambiguity, e.g.). In this case, student perceived clarity may be achieved, but not logical clarity. A muddled, fallacious, and incomplete explanation may be perceived as being clear by students. Ambiguity and vagueness
in such a case are not psychological inhibitors, but they are logical inhibitors, in part because they are often undetected.

The point is that the dual product sense of 'clear teaching', coupled with philosophical distinctions regarding terminology, is quite useful in analyzing the "inhibitors" research. The difference on the inhibitor side is that the operational uses and the ordinary uses are not far out of line with one another (as they were with the clarity research). Rather, the technical employment of the terms in philosophy makes for the major conceptual distinctions. In the clarity research, it was advised that one pay attention to ordinary use. In the "inhibitors" research, one is likely to benefit from the philosophic use.

9. What is the relationship between 'clarity' and 'inhibitors to clarity' (including 'vagueness' and 'ambiguity') in the research and in ordinary use?

The first point to be made is that each of the research lines focuses on the lecture aspect of teaching. The inhibitors line does so explicitly; the clarity line implicitly, but nonetheless it is most assuredly the case.
Second, clarity and the inhibitors of clarity are both seen as operating as mediating variables in the teaching situation. Put differently, student perception of clarity, according to Hines (1981), acts as a facilitator for student achievement and satisfaction. Land (1979) sees vagueness terms and other inhibitors as causes for student perception of teachers as being confused, which in turn causes students to feel uncertain as to what is to be learned.

Third, both lines of research parallel closely Martin's conceptual work on 'explanation', a point related to the first issue discussed above regarding the lecture focus. A bit more emphasis is placed on the teacher's knowledge and actual transmission of subject matter in the "inhibitors" research, but other issues relevant to clarity (gap-filling, consideration of the intended audience, and organization, e.g.) are equally relevant to the inhibitors to clarity. The related work of Ennis and of Soltis are relevant both to the clarity and to the inhibitors to clarity lines of research. If one's verbal behavior negatively affects the logical content or psychological completeness of the explanation, the
explanation is likely to be flawed in one or both ways.

Fourth, the lines of inquiry parallel one another in terms of dependent variables of interest. Both focus on relatively low-level cognitive (rote memory?) tasks. The clarity link is fairly simple in these cases. In cases in which content is more complex, and/or outcomes desired at higher levels (creativity, divergent thinking, critical reasoning, e.g.), the goal of clarity is less well-defined. It is here that notions of arousing dissonance or incoherence as motivators enter.

The lines are similar in a fifth way — they both engage in terminological legislation that could be misleading outside the research context (and perhaps even within). The point has been made in detail in several different contexts in the preceding chapters.

It appears that in many ways, and in terms of both strengths and weaknesses, these are two parallel research efforts. As such, they might well inform one another. Both would be informed by more and better conceptualization, grounding the empirical research in some
philosophical/theoretical base.

10. **What of significance is left out of the picture by adopting the research approach discussed above?**

This question affords the opportunity to make some suggestions regarding improvement in the research effort. Three points focusing on conceptual issues for 'clarity' follow. The first point to be made regarding operational 'clear teaching' in light of what has been discussed above is that it ought to include both product senses of conceptual 'clear teaching' if the assessment is to have meaning. That is, teachers should not only be understandable to students, but correct and reasonably complete as well.

A second suggestion falls out of the role of question-answering or generating and the ability of teachers to gauge or recognize students' intellectual predicaments. What is brought to mind, as stated earlier, is Dewey's call for a blending of the logical with the psychological by the teacher. Teachers need to "psychologize" material to engage students in educative experience (Dewey, 1902). It would appear that constant or
complete clarity (in the form of didactic or expository teaching, for example) may not be desirable. Rather, periods of incongruity, perhaps even intentional, teacher-caused incongruity, as a means to generating intellectual predicaments in students, should intersperse clear presentations. It may be that clarity is best pursued in episodic fashion.

Third, in terms of clarity over long periods of time (in the field, clarity over several lessons), the need for alternating between congruence and incongruence may be even more important, both as a motivating force and as a means to progressive refinement of one's understanding (again Dewey is helpful, this time in terms of reflective thinking). This notion of long-term clarity as opposed to single teaching episode clarity found in the research context is the central issue in the discussion over operational definitions.

While the focus of clarity is on ordinary use, the more technical philosophical use is of central importance to improving the inhibitor research. A more sophisticated rendering of 'vagueness' and 'ambiguity' in all their forms would be helpful.
With this rendering, their uses and abuses could be made known and employed to improve instruction.

For instance, recognizing the multiple ways that indecision in the form of vagueness and ambiguity may result is exceedingly important in both the research and in the teaching context. Vagueness can result from ignorance (saying "a few" when a specific number is unknown) or from the inability to speak more precisely because the content does not admit of a more precise treatment to name only two sources.

Ambiguity similarly has multiple causes, discussed in greater detail in Chapter VII. The points of significance are, first, that not all instances of vagueness and ambiguity are troublesome; and second, that when they are troublesome, they are so for different reasons. To elide the terms may be to cause confusion over how to remedy these problems.

A firmer philosophical base, missing from both lines of empirical research, could have avoided a number of the conceptual problems found in the research. Rather than dwell in hindsight, however, philosophy can still be applied to these research programs.
The initial point of concern of this study is with 'teacher clarity' as an ordinary language term. The analysis focuses on how the use of the term "in the world" might inform the operational definition of 'teacher clarity' as employed in the research context. One important outcome of this analysis is the double product sense of 'clarity' (logical and psychological) in ordinary language. The operational definition in the clarity research relies solely on the psychological "student perceived" notion. A fuller version ought to include items encompassing both senses of clear teaching.

Second, the logical role of question-answering and, as a corollary, generating dissonance when questions ought to be asked but are not, sheds additional light on clarity as it relates to actual teaching. As stated earlier, viewing clarity as episodic, interspersed with periods of incongruence and inquiry, is perhaps the best way to view teaching in the natural classroom.

In terms of comparing the operational definitions, Hines, by eliminating items not directly observable and/or not appropriate for single-shot laboratory teaching, developed an
instrument that may lack validity when employed in the real classroom. Adding the eliminated Bush et al. and Kennedy et al. items improves the instrument in this regard, but adds little with respect to remedying the limits of the student-perceived outcome focus.

The existence of multiple instruments or lists of clarity behaviors also creates a communication problem, even within the research community. There is the possibility of equivocation between lists, unless one is careful to specify which clarity indicators are being employed.

With respect to the definitional role of the items, it is difficult if not impossible to speak of 'teacher clarity' in terms of strict necessary and/or sufficient conditions. The term seems more like a "range" term and, as such, does not admit of a true operational definition that will not distort the ordinary meaning. An attempt to force the concept into a strict listing of behaviors either results in trivial circularity or in the creation of a new concept and the resultant possible equivocation between operational and ordinary usage.
As a final note on operational clarity, this might be a good time to begin considering the fallout, if you will, from viewing teacher clarity as something admitting of a listing of behaviors to be followed. First, from the perspective of the evaluator, it is highly unlikely that clarity can be assessed simply by looking for such behaviors. Judgment based upon the observer’s knowledge of teaching and subject matter proficiency is likely necessary, if Ennis and Munson are correct.

Second, from the teacher’s point of view, while being clear is exceedingly important, merely being clear is not enough. When to be clear and when to arouse dissonance and questioning are extremely important and related issues in need of attention. I suppose I fear too mechanical an application of listings of behaviors that, arranged in the right order and with the optimal frequency, might appear capable of bringing about those outcomes schools claim to desire. Indeed, the question of outcomes desired is critical to prescriptions for teaching methods, and it is this dialogue over outcomes that fails to surface in any meaningful way in much of the teacher effectiveness research.
11. What might we now say about the research support given to 'clarity' by the earlier studies reviewed by Rosenshine (1971) and by Rosenshine and Furst (1971)?

If one were to take a new look at the early studies that gave initial support to the link between clarity and student achievement, a number of the criticisms would still hold. What this analysis does, however, is provide a way to look at one of the main areas of criticism - face validity - with new insights.

It appears that Heath and Nielson (1974), Hines (1981), and Cruickshank and Kennedy (1985) all were critical of some of the studies being included, as they did not appear to study 'clarity'. In particular, Chall and Feldmann, Fortune, Wallen, and Wright and Nuthall seem most severely criticized. What might we now say?

First, with respect to Chall and Feldmann, "appropriateness/difficulty of the lesson" has direct relevance to the evaluation of an explanation, both from the objective (Ennis) and subjective (Soltis) perspective. Martin's gap-filling condition would be added support, as
Wallen's "intellectual effectiveness" also has direct ties to the phenomenon of 'explanation', with the focus on explaining "concepts clearly ...such that the student seemed to be gaining understanding" (p. 218). This is nearly identical to the Hines et al. (p. 88) statement regarding the high-inference clarity notion, as well.

Fortune and Wright and Nuthall afford a bit more difficulty. The problem with the Fortune study is the lack of information as to how "lesson presentation" is used. If used in a manner similar to the Fortune et al. "clarity of presentation", then the link is obvious. Without further information, the assessment is impossible beyond the parallels between 'explaining' and 'presenting' (recognizing of course that they are not identical terms).

The Wright and Nuthall focus on the teacher phrasing of questions is equally puzzling. As Cruickshank and Kennedy (1985) point out, it is difficult to determine how the number of times a question is asked affects clarity. Asking a question once and being understood is probably evidence of clarity, but does clarity decrease with
the rising number of times a question is asked or with the total number of questions asked? From the work of MacMillan and Garrison (1983), the more important question would be the nature and content of the question, whether it addresses the "intellectual predicament" of the student relative to the "epistemology of the situation". Is it a question that epistemologically ought to be asked?

The philosophical work cannot help the Rosenshine and Furst review regarding the failure to report significance, or relative to many of the other methodological flaws, but at least two of the four studies critized for failure to meet standards of face validity have been judged improperly. They do fall in line with notions of clarity of explanation, in whole or in part.

Concluding Remarks

It is the intent of this study to apply the tools of philosophical analysis to the empirical study of clear versus unclear teaching. The purpose of all this research, in terms of Cruickshank's model of research on teacher education, is to add to the content of teacher
education programs, in the hope of positively affecting the quality of teachers coming out of those programs. Relatedly, information can be used at entrance into the program of teacher preparation (as a screening device and/or as a diagnostic tool) as well as for formative and summative evaluation.

All this implies that a part of the role of the teacher, or the good teacher, is being clear. While this point is difficult to argue against when presented in isolation, in the context of teaching, things are not so simple. Philosophical analysis has exposed a number of complicating factors relative to 'teaching' generally construed, and to notions of 'clear teaching' more specifically. In particular, the dual product sense of 'clear teaching', the equivocation possible between and among operational, ordinary, and philosophic uses of terms, and the potential of programmatic stipulation resulting from the empirical conception of clear teaching have been prominent.

The first two above probably need no further explanation; the third may. All that is involved is the possibility that clear teaching, once defined and related empirically to higher student achievement scores, will become the criterion
against which good teaching will be gauged. While being clear is often good, it is not always good. Sometimes, to be good is to be unclear, at least temporarily.

Such can be the case if content is difficult and not amenable to immediate student understanding or if it is advisable to generate dissonance due to the student's "intellectual predicament" and the "epistemology of the situation". Episodic clarity becomes the goal, as well as the method.

A final concern, not directly related to the philosophical analysis employed here, but directly related to teaching and learning in the schooling system, is the socio-cultural context within which the teaching paradigm spins. As stated earlier, much of the reason for success or failure in terms of school achievement lies with the teacher. But many other factors intervene to affect ultimate student performance. Perhaps the most neglected of these factors, in teacher effectiveness literature at least, is the conscious and rational process of rejection of the teaching exchange by some students.

The processes of "cultural production" and "cultural reproduction" accomplished within and by
a schooling system nested in a broader social, political, economic, and cultural system are being studied by a number of educational sociologists, curriculum theorists, and philosophers of education, among others. Information from this study goes a long way to rounding out the dynamics of success and failure, both as concepts and as experienced phenomena in the classroom.

Socio-cultural dynamics go a long way to determining the intellectual predicaments of students. Those students from minority and/or working class backgrounds find in school a culture and set of intellectual questions wholly alien to their lived experience (Willis, 1977, 1983; Wexler, 1983). This, combined with the meager likelihood of material payoff in later life as a result of schooling, leads them to reject the whole of mental labor in favor of manual labor. To date, teacher effectiveness literature remains unaffected by these insights. The teacher education curriculum only sporadically addresses these areas; and given the move to return to the "managerial metaphor" (Berliner, 1962), it is less and not more likely to address them in the future.
If theory is to inform practice, if teachers are to be more than mere practitioners, to be "students of education" (Dewey, 1904), the researchers of teacher effectiveness need to open themselves up to this body of knowledge and to the realization that teaching is a political as well as an intellectual act.
APPENDIX A

Clear Teacher Behaviors

Cruickshank, Myers, and Moenjak (1975)
A. Providing students with feedback makes things more clear.

A clear teacher...

1. Tells the student whether he is right or wrong.
2. Helps the student to do the first problem right.
3. Asks the student before he starts to work if he knows what to do and how to do it.
4. Shows the student where he is wrong.
5. Gives the student frequent grades or marks.
6. Goes over all work and tests with students.
7. Gives the student individual help.
8. Gives frequent tests or quizzes.
9. Lets students ask questions.
10. Reviews what has already been studied.
11. Has students review what they have already learned.
12. Has students work problems on the board instead of asking them only to tell their answers.
13. Reviews work with students in preparation for a test.
14. Answers students' questions.
15. Asks students questions to find out if they understand what he has told them.
16. Explains the answers to questions.
17. Gives students an example and then lets them try to do it.
18. Tells students what to do and then has different students work different examples of what they are supposed to do.
19. Gives a quiz on what was studied the day before.
20. Takes time to answer students' questions before a test.

B. Teaching things in a related, step by step manner makes things more clear.

A clear teacher...

1. Teaches step by step.
2. Teaches one thing at a time.
3. Finishes teaching what he wants to teach without stopping in the middle of it.
4. Talks only about things related to topic he is teaching.
5. Starts teaching at the beginning of a book and finishes at the end of it.

C. Orienting and preparing students makes things more clear.

A clear teacher...

1. Prepares the student for what he will be doing next.
2. Writes the assignment on the chalkboard.
3. Gives pre-tests.
4. Explains in detail what will be on a test.
*5. Explains the assignment and the materials to be used such as dittos.
6. Tells students why he thinks they should learn what he is teaching.
7. Gives students written directions for doing something or makes them write the steps, in order, for doing it.
8. Writes assignments and directions for doing things on the board.
*9. Explains the work to be done and how to do it.
10. Relates what has already been learned to new material.
11. Relates what he is teaching to real life.
12. Shows students how different subjects are related.

D. Providing students with standards and rules makes things more clear.

A clear teacher...

1. Makes the students aware of standards and rules to be followed.
2. Tells students when assignments are due.
3. Makes students do things right.
4. Uses contracts for grading.
5. Tells students what he wants them to do.

E. Using a variety of teaching materials makes things more clear.

A clear teacher...

1. Uses overhead projectors, films, textbooks, pictures, real objects, diagrams, maps, demonstrations, etc.
2. Provides the student with the materials he needs when he needs them.
3. Explains orally and in writing.

*F. Repeating and stressing directions and difficult points makes things more clear.

A clear teacher...

1. Repeats the same thing more than once.
*2. Stresses difficult points.
3. Repeats slowly.
4. Repeats for students in groups what he taught the whole class.
5. Repeats directions.
6. Repeats enough but not too much.
*7. Repeats questions and explanations if students don't understand them the first time.
8. Says a spelling word more than once.
9. Tells students to take notes.
10. Reads the directions with the students.
11. Has students make outlines.
12. Writes on the board and explains as he writes.
13. Writes important things on the board.

G. Demonstrating makes things more clear.

A clear teacher...

*1. Shows students how to do things.
2. Tells and shows students what they should do.
3. Gives an example on the board of how to do something.
4. Uses some students' work as examples to show other students how to do something.
5. Shows movies and explains them afterwards.
6. Stops a filmstrip or movie before it is finished to explain or discuss it.
7. Uses examples when explaining.
8. Explains the work to be done and how to do it.
H. **Providing practice makes things more clear.**

A clear teacher...

1. Gives the student daily practice.  
2. Gives the student enough time to practice.  
3. Gives the student various kinds of practice.  
4. Gives students practice by giving workbook assignments.  
5. Has students write definitions, etc., many times.

I. **Adjusting teaching to the learner and the topic makes things more clear.**

A clear teacher...

1. Gives the student work he is able to do.  
2. Teaches at a pace appropriate to the topic and the students.  
3. Stays with the point on topic until it is understood.  
4. Starts the lesson slowly.  
5. Explains something and then stops so that students can think about it.  
6. Takes time when explaining.  
7. Gives explanations that the student understands.  
8. Speaks slowly.  
9. Has students who understand how to do the work begin while he explains it again to others.  
10. Separates students who understand from others who don't.

J. **Providing illustrations or examples makes things more clear.**

A clear teacher...

1. Goes from the general to the specific.  
2. Supports what he teaches with facts from the textbook.
K. Communicating so that students can understand makes things more clear.

A clear teacher...

1. Speaks so that all the students can hear.
2. Pronounces words distinctly.
3. Uses common words.
4. Speaks with expression.
5. Speaks grammatically.
6. Uses words correctly.
7. Gives students dittos that are clearly printed.
8. Stands so that everyone can see what he writes on the board.
9. Writes legibly on the board.

L. Providing examples makes things more clear.

A clear teacher...

1. Uses common examples.
2. Gives examples and explains them.
5. Shows students examples of how to do classwork or homework.
7. Tells humorous stories to explain.
8. Explains and then works an example.
9. Works examples and explains them.
10. Works difficult homework problems, selected by students, on the board.
11. Explains new words.
13. Supports the lesson with specific details.
14. Provides additional information besides what is in the book.
15. Supports what he teaches with facts from the textbook.

M. Causing students to organize material in a way meaningful to them makes things more clear.

A clear teacher...

1. Has students make outlines.
2. Tells students to take notes.
APPENDIX B

Twenty-eight Prime Discriminators of Teacher Clarity

Kennedy et al. (1978)
Set A Behaviors

1. Gives explanations we understand.
2. Teaches at a pace appropriate to the topic and to us.
3. Tries to find out if we don’t understand and then repeats things.
5. Describes the work to be done and how to do it.
6. Asks if we know what to do and how to do it.
7. Prepares us for what we will be doing next.
8. Gives specific details when teaching.
9. Repeats things that are hard to understand.
10. Works examples and explains them.
11. Gives us a chance to think about what has been taught.
12. Explains something and then stops so we can think about it.
13. Shows examples of how to do classwork and homework.
15. Answers our questions.
16. Goes over difficult homework problems on the board.
17. Shows us how to remember things.

Set B Behaviors

19. Stays with the topic until we understand.
20. Repeats things when we don’t understand.
21. Explains something and then works an example.
22. Explains something and then stops so we can ask questions.
23. Shows us how to do the work.
24. Explains the assignment and the materials we need to use to do it.
25. Stresses difficult points.
26. Asks questions to find out if we understand.
27. Shows examples of how to do classwork and homework.
28. Explains how to do assignments by using examples.
29. Shows the difference between things.

NOTE: Items 13 and 27 were one of seven pairs of items that appeared on both Set A and Set B. The total number of prime discriminators is 28 and not 29, due to this duplication.
APPENDIX C

Clarity Observation Instrument (COI)

Hines (1981)
SECTION 1

Indicate by marking a "1" to the right of the appropriate behavioral item below each time you observe that behavior to occur in this teaching episode.

TEACHER BEHAVIOR

<table>
<thead>
<tr>
<th>STRESSES (EMPHASIZES) IMPORTANT ASPECTS OF CONTENT</th>
<th>FREQUENCY</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Points out what is important for students to learn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Repeats things (terms, rules, definitions, concepts) that are important</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Writes important things (terms, rules, definitions) on the board/chart</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Summarizes the material presented in the lesson</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

EXPLAINS THE CONTENT OF INSTRUCTION

| 5. Explains things (aspects of the content) |           |       |
| 6. Uses examples when explaining |           |       |
| (a) Uses verbal examples |           |       |
| (b) Uses written examples |           |       |

PROVIDES FOR STUDENT ASSIMILATION/SYNTHESIS OF CONTENT

| 7. Explains what unfamiliar words mean |           |       |
| 8. Explains something and then stops so that students can think about it |           |       |
| 9. Shows similarities and differences between things |           |       |
| 10. Shows students how to remember things |           |       |
| 11. Reviews what has already been studied (taught) |           |       |

ASSISTS AND TRIES TO ENSURE STUDENT UNDERSTANDING OF CONTENT

| 12. Asks questions to find out if students understand |           |       |
| (a) Asks questions of the class |           |       |
| (b) Asks questions of specific students |           |       |
| 13. Has individual students work publicly (e.g., on the chalkboard) |           |       |
| 14. Examines student's work privately (e.g., at student's/teacher's desk) |           |       |
| 15. Allows time (pauses) for students to ask questions |           |       |
| 16. Repeats things when students do not understand |           |       |
| 17. Answers students' questions |           |       |
| 18. Provides time for students to practice (e.g., work examples) |           |       |
| (a) Students engage in independent seatwork |           |       |
| (b) Students engage in group work |           |       |
| (c) Number of practice examples (activities) |           |       |
| (d) Total time for practice (in minutes) |           |       |
Please respond to the items below based on your observation of this teaching episode. On the scale provided to the right of each item, circle the number which best corresponds to your perception relative to that item.

The Instructor:

19. answered students' questions adequately

20. used relevant examples when explaining

21. taught the lesson step-by-step

22. provided students with sufficient examples of how to do the work

23. presented the lesson in a logical manner

24. adequately informed students of the lesson objectives or what they would be expected to be able to do on completion of the lesson

25. was adequately prepared for teaching this lesson

26. explained the content of instruction

27. stressed (emphasized) the aspects of content it was important for students to learn

28. assessed student understanding and provided for better understanding of content when necessary

29. provided for student assimilation and synthesis of content

30. the instructor was

31. the instructor was

32. taking into account the questions asked on the test, to what extent do you consider the material covered in the lesson sufficiently adequate to enable students to perform well on the posttest?
LIST OF REFERENCES


negotiation as an approach to moral education.
Paper presented at the American Educational
Research Association annual meeting, Boston.

questions, metaguestions, and philosophical
puzzles. Paper presented at the American
Educational Research Association annual
meeting, Chicago.

Rosenshine, B. (1971). Teaching behaviors and
student achievement. London: National
Foundation of Educational Research.

Rosenshine, B. (1976). Recent research on
teaching behaviors and student achievement.
Journal of Teacher Education, 27 (1), 61-64.

Rosenshine, B. (1983). Teaching functions in
instructional programs. The Elementary School
Journal, 83 (4), 335-351.

engaged time. British Journal of Teacher
Education, 4 (1), 3-16.

teacher performance criteria. In B.D. Smith
(ed.), Research in Teacher Education.

Hutchinson.

(ed.), Philosophy and Ordinary Language.
Urbana, Ill.: University of Illinois Press,
108-127.

Springfield, Ill.: Charles C. Thomas.

Scheffler, I. (1979). Beyond the Letter. London:
Routledge and Kegan Paul.


