This is to certify that the

thesis entitled

A Study of Teacher Planning:
Description and Theory Development Using
Ethnographic and Information Processing Methods

presented by

Robert Johnston Yinger

has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Education

Lee S. Shulman
Major professor

Date 11/18/77

O-7639

A STUDY OF TEACHER PLANNING: DESCRIPTION AND THEORY DEVELOPMENT USING ETHNOGRAPHIC AND INFORMATION PROCESSING METHODS

By

Robert Johnston Yinger

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Counseling, Personnel Services
and Educational Psychology

1977

ABSTRACT

A STUDY OF TEACHER PLANNING: DESCRIPTION AND THEORY DEVELOPMENT USING ETHNOGRAPHIC AND INFORMATION PROCESSING METHODS

By

Robert Johnston Yinger

The major purpose of this study was to investigate teacher planning by means of a detailed case study of the processes involved in one elementary (first-second grade) teacher's planning decisions during a five month period of instruction. The study was designed to address a need for descriptions and theoretical models of teacher planning and to examine the usefulness of certain decision modeling methods for describing complex decisions as they occur in field settings. To accomplish this, the study used the perspectives and methods of both ethnography and information processing psychology.

The study involved two phases of data collection. In the first twelve weeks of the study, approximately forty full days were spent observing and recording the teacher's activities in both the preactive and interactive phases of teaching. Also during this phase, the teacher's planning decisions were recorded as she "thought aloud" during her planning sessions. The second phase of the data collection further investigated the teacher's planning by observing her behavior in the Teacher Planning Shell (a simulation task developed for this study) and in three judgment tasks examining the teacher's perceptions of her

students and instructional activities. Additional classroom observations and interviews were also conducted during this phase.

Two central aspects of the teacher's planning and instruction that emerged in this study were planning for instructional activities and the use of teaching routines. Activities were described as the basic structural units of planning and action in the classroom and were portrayed as "controlled behavior settings" which were shaped and molded by the teacher to conform to her perceptions and purposes. Seven features of instructional activity were identified (location, structure and sequence, duration, participants, acceptable student behavior, instructional moves or routines, and content and materials) and used as a basis for analyzing and describing the teacher's planning and instruction.

Teaching routines emerged as another distinctive feature of the teacher's planning "technology." Four types of teaching routines were described in this study: activity routines, instructional routines, management routines, and executive planning routines. Functionally, routines were characterized as methods the teacher used to reduce the complexity and increase the predictability of classroom activities, thus increasing her flexibility and effectiveness.

Two models of teacher planning were developed in this study. The first was a structural model of preactive planning describing planning at five levels: (1) yearly planning, (2) term planning, (3) unit planning, (4) weekly planning, and (5) daily planning. The second model of planning generated in this study was a theoretical model of teacher planning based on data collected in this study and on studies of planning in the areas of chess thinking, musical composition, art, and

architectural design. Planning decisions were characterized by processes emphasizing problem finding and problem formulation as well as problem solving. In contrast to traditional models of planning emphasizing the statements of goals, the specification of alternatives, and the choice among alternatives, this model placed greater emphasis on finding and developing the planning problem and on the "design" process.

Three stages of planning were represented in the planning model. The first stage, problem finding, was portrayed as a "discovery cycle" where the teacher's goal conceptions, her knowledge and experience, her notion of the planning dilemma, and the materials available for planning interact to produce an initial problem conception worthy of further exploration. The second stage in the planning process was problem formulation and solution, where problem solving was characterized as a design process involving progressive elaboration of plans over time. The third stage of the planning model involved implementation of the plan, its evaluation, and its eventual routinization.

Dedicated to

My parents, who have
loved me and encouraged me
throughout all my endeavors

ACKNOWLEDGEMENTS

A study of this magnitude would not have been possible except for the support and guidance provided by my doctoral guidance committee and the resources and support furnished by the Institute for Research on Teaching.

I want to express my appreciation to the members of my guidance committee, Dr. Robert Bridgham, Dr. Joe Byers, Dr. Christopher Clark, and Dr. Edward Smith, who had the confidence in my abilities to approve this project and the continuing interest in the work to help see it through to its completion. To my chairman, Dr. Lee Shulman, a special thanks. He has been a continuous source of ideas, support, and challenge throughout this project and has served as an inspiration and a model for scholarship throughout my graduate studies.

This study was conducted while serving as a Research Intern at the Institute for Research on Teaching at Michigan State University. The Institute is funded primarily by the Teaching Division of the National Institute of Education, United States Department of Health, Education, and Welfare (Contract No. 400-76-0073). The Institute provided the support, resources, and research environment that enabled me to pursue a study of this intensity and duration. The many individuals who reacted to my ideas and findings throughout the study are too numerous to mention. Thank you all. I want to especially thank Debbie, Sheba,

and Lynn for the many hours spent transcribing the field notes, protocols, and early drafts. Their help was invaluable.

When one decides to do a study of only one individual, a great deal is riding on his or her participation and cooperation. I want to express my greatest appreciation to Mrs. Lisa who was willing to open up her professional life for five months and put up with an outsider's attempts to understand what was going on in her head. Her friendship is an important outcome of this study.

Finally, I want to thank my wife Janet for her companionship and love. She has been a never ending source of patience, support, and encouragement and a joy to live with.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Page

CHAPTER I

INTRODUCTION TO THE STUDY

Problem

Much of the research on teaching in the last twenty years has involved the search for those teaching behaviors that are related to teaching effectiveness. The results of these efforts have been somewhat disappointing in that there have been few teaching behaviors that have been strongly and consistently related to student achievement or student attitudes. A general characteristic of most of these studies is their focus on teaching behavior that occurs when students are in the classroom. Jackson (1965) has referred to these face-to-face encounters between teacher and students as "interactive" teaching and has contrasted these behaviors with "preactive" teaching. Preactive teaching includes behavior that occurs before and after school, during recess, and at other times when the teacher is alone in the classroom. This behavior in the "empty classroom" may include such things as preparing lesson plans, marking papers, setting up equipment, making and running dittos, thinking about how to deal with certain behavior or learning problems, and so forth. Although this distinction between preactive and interactive teaching has been popular for many years, there have been few studies that have set out to examine the world of teaching when the students are absent.

Recently it has become popular to characterize teachers as problem solvers and decision makers (Shulman and Elstein, 1975; Lanier and Shulman, 1975). Many educational researchers have contended that the most important teaching skill is decision making (e.g., Shavelson, 1973), or have gone on to assert "in teaching it's the thought that counts."[1] One consequence of this view is the temptation to portray the teacher as a rational information processor who is chiefly involved in making diagnoses, testing hypotheses, and making decisons all day long. It is much more likely that this conceptualization of teaching more accurately describes some moments of teaching than others. Jackson argues that although there may be some advantage to using logical and rational models to describe the teacher's in-class activities, opportunities for this type of behavior during interactive teaching are "few and far between" (Jackson, 1965). The rapidity and immediacy of the teacher's interaction with pupils in the classroom, he argues, precludes the rational-purposeful kind of thinking that is normally associated with problem solving and decision making.

To understand teaching as a purposeful, reflective activity, it is necessary to look in those places where this type of behavior is most likely to occur. Jackson argues that the preactive phase of teaching is one place where the notion of the teacher as problem solver and decision maker may have the most descriptive power. He goes on to say:

> As the teacher goes about deciding what textbook to use, how to group the children for reading, or whether to notify Billy's parents of his poor performance in arithmetic, his behavior is at least analyzable in terms that describe the

---

[1]This saying has been attributed to Dr. Perry Lanier and has become the informal motto of the Institute for Research on Teaching at Michigan State University.

> rational problem solver. At such moments concepts such as evidence, evaluation, prediction, and feedback have real meaning for understanding what the teacher is doing. It is doubtful that they have the same meaning in the interactive setting. (Jackson, 1965, p. 15)

Of the many different things that teachers do in the preactive phase of teaching, one of the most important may be planning. It may be a rare teacher and classroom that would be able to function effectively without some kind of planning by the teacher. The wealth and variety of instructional materials available for teaching, the emphasis on meeting school or district objectives, and the wide range of student aptitudes in most classrooms are but a few of the demands on teachers that virtually necessitate thinking and planning for the term, coming weeks, or even the next day.

The importance of teacher planning has been further emphasized in recent ecological studies of the classroom (Kounin, 1970; Gump, 1969; Doyle, 1977 a,b). In a study of beginning teachers, Doyle (1977 a) found the most salient characteristics of the classroom environment for those teachers were: (1) multidimensionality, (2) simultaneity, and (3) unpredictability. By multidimensionality, Doyle means that classrooms serve a variety of purposes not all of which are compatible. Classrooms are simultaneous in that significant events often occur at the same time rather than following each other in serial fashion. Unpredictability refers to the degree to which the complexity of ebb and flow in classroom events prevents the teacher from accurately predicting the outcome of a planned activity. By adding to these characteristics those of urgency and spontaneity or, as Jackson (1968) refers to it, the "immediacy" of the classroom, one arrives at a picture of the

teaching environment dominated by two features: complexity and unpredictability.

In addition to characterizing the environment in which teachers are required to operate, ecological psychology acknowledges and emphasizes the subtle yet complex interdependencies between behavior and environment. As a way of looking at classrooms, ecological studies are based on the premise that the environmental demands of the classroom both shape observed behavior and establish limits to the range of response options available to the actors (Doyle, 1977 b). In other words, "settings have plans for their inhabitants' behavior, and inputs are achieved within the limits of the settings' control system to produce the planned behavior" (Barker, 1963). What this means for teachers is that not only is the classroom environment complex and unpredictable, but teaching behavior in the classroom may be to a large degree "controlled" or "planned" by the environment itself. Jackson illustrates how one central feature of the environment, the students, may affect teaching by suggesting that:

> ...the students to some extent control what the teacher does. When they are present, much of the teacher's behavior is in response to their requests and questions and could not have been planned in detail ahead of time. In effect, the students "tell" the teacher what to do, and he simply does it without much thought. Much of what goes on during a teaching session (or for that matter during almost any kind of an interpersonal encounter) is predictable in a broad sense only; the specifics must be dealt with as they happen. (Jackson, 1965, p. 13)

If it is true that teaching behavior in the classroom is, to a large degree, a function of the features of the environment, then it becomes an important question to ask how the teacher can influence the environment so that behavior within the interactive setting conforms as

closely as possible to the teacher's goals. It may be that teacher planning becomes the major tool by which teachers manipulate teaching environments to shape and control settings that may later shape and control their own behavior.

To date, there have been no studies of teacher planning that have explored the role that planning plays either psychologically or functionally in teaching. The ecological studies have been concerned with identifying the salient features of teaching environments and describing teaching behavior that is "adaptive" to the environment. Kounin's (1970) study of classroom management (much of whose findings have since been replicated by Brophy and Evertson (1974, a,b,c) suggests that the behavior of successful classroom managers is characterized by "withitness," or the awareness of what is going on at all times in the classroom; "overlappingness," or the ability to sustain one activity while doing something else at the same time; "smoothness," or the ability to maintain classroom continuity without unnecessary interruptions or confusion; and "momentum," or the ability to maintain proper lesson pacing and flow. Similarly, Doyle (1977 a) found five teaching "skills" that were successful for reducing environmental complexity for beginning teachers:

1. Chunking, or the ability to group discrete events into larger units.

2. Timing, or the ability to monitor and control the duration of events.

3. Overlap, or the ability to handle two or more events at once (borrowed from the Kounin).

4. Differentiation, or the ability to discriminate among units in terms of their immediate and long term significance.

5. Rapid judgment, or the ability to interpret events with a minimum of delay.

The picture of teaching that these studies paint is of the environment on the one hand, characterized by such things as complexity and unpredictability, and on the other hand, successful or "adaptive" teaching behavior such as "withitness," "chunking," "smoothness," and "timing." What they fail to portray are those elements of teaching that allow or facilitate a teacher's coping with these demands of teaching. It is suggested here that it is largely through planning that teachers simplify and shape the teaching environment so that they can successfully deal with classroom life. This portrayal of planning as the missing yet important element in these studies is illustrated in Figure 1.1.

To summarize the argument thus far, most of the studies that have examined teaching have ignored that part of teaching that occurs before students arrive at and after they leave school; and if one is interested in portraying the teacher as a problem solver or decision maker, it is probably more likely that this type of deliberation will occur in these "preactive" phases of teaching. Furthermore, of the many different things that teachers do in the "empty classroom," one of the most important may be planning. Ecological studies have pointed out the demanding characteristics of the environment and successful behavior for coping with the complexity and unpredictability of the classroom. It is posited that planning may play an important role in helping teachers to function effectively and efficiently in the classroom by allowing them to manipulate and shape behavior settings. The study of planning, therefore, becomes important because of

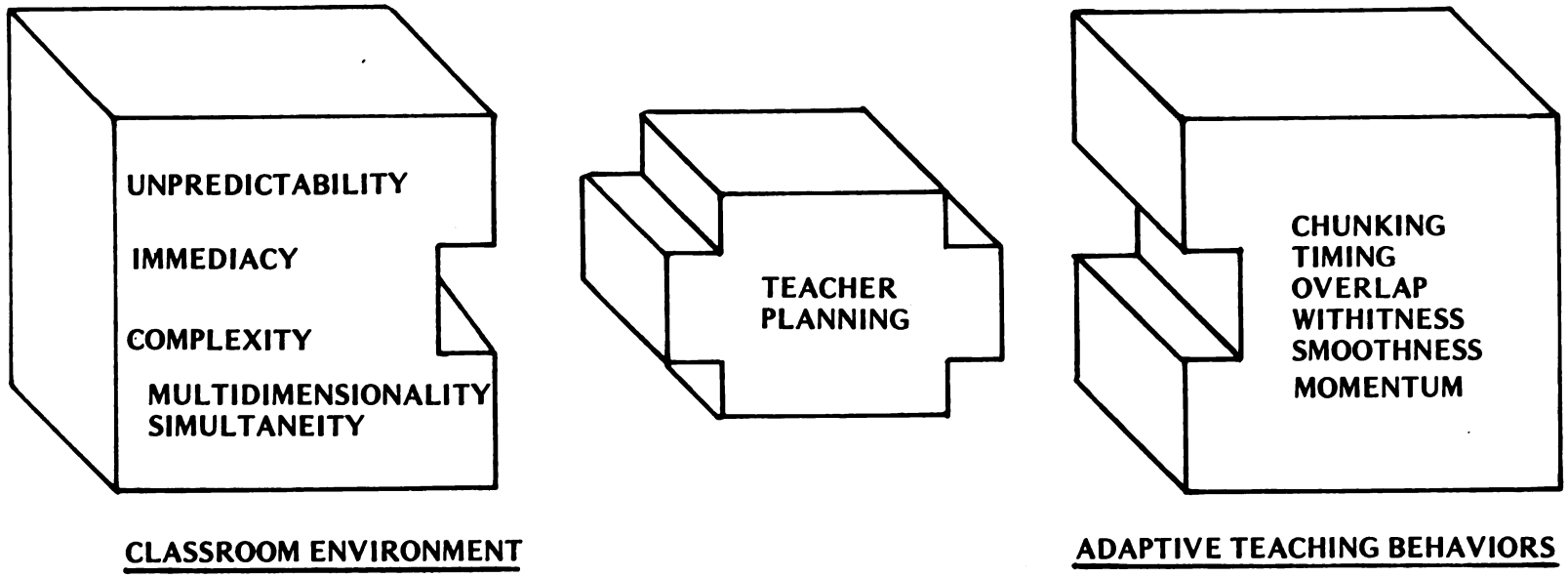


FIGURE 1.1 The missing element in studies of teaching

its role in teaching and because it may be one of the important teaching activities where the teacher can and does function in a more rational and deliberative manner.

If this thesis is warranted, it may also have important consequences for the training of teachers. If effective and efficient methods for making planning decisions can be described and developed, they could become an important feature of teacher training and, thus, a powerful way to improve teacher effectiveness.

Much of traditional teacher training has focused on those aspects of teaching important to teacher-pupil interaction in the classroom. Since the early sixties, an emphasis has been put on planning and instruction that Jackson (1968) has referred to as the "engineering" point of view. This viewpoint includes both a set of values about the educational process and a set of instructional procedures by which the values can be implemented. Jackson summarizes the "engineering" viewpoint as follows:

> The core of values to be discussed here--the "goods," so to speak, of the engineering point of view--comprise the standards by which one might judge a piece of machinery or the plans for achieving a military objective. The first question, of course, is: Will it work? Will it get the job done? This question, which entails the criterion of effectiveness, implies a clear idea of what job is to be done or what objectives are to be reached. Next comes a series of secondary questions having to do with the efficiency of the procedure under consideration. After ascertaining that it will work, the critic is next interested in knowing whether it will do so speedily, accurately, precisely, and economically. These questions are chiefly concerned with the conservation of energy and expense. In the best of all possible worlds, according to this view, jobs should be done as cheaply and as quickly as possible, with a minimum amount of wasted motion. (Jackson, 1968, p. 164)

When this viewpoint is applied to education, it usually takes on some variation of the following form. The first requirement is preparation of a detailed statement of objectives, preferably in "behavioral" form. Next one must analyze the skills and knowledge that a student will need to attain the objectives. This analysis is often carried out by a process called "task analysis." After the task is analyzed, the skills and knowledge that the student already possesses are measured. After instructional materials and techniques are selected, based on where the student is in relation to the objectives, the rest of the instruction process proceeds by the following sequence: teaching, evaluation of performance relative to the objectives, and finally, if the student has failed to master the objectives on the first try, re-teaching the lesson. This specific cycle of instruction has become known as the Basic Teaching Model of Glaser and includes the essential features of most goal-referenced instructional models (e.g., Popham and Baker, 1970).

In addition to instruction, the "engineering" point of view has been prescribed for curriculum and classroom planning. For example, Taba (1962) recommends the following eight steps for planning a unit:

1. Diagnose needs.
2. Formulate specific objectives.
3. Select content.
4. Organize content.
5. Select learning experiences.
6. Organize learning experiences.
7. Evaluate.
8. Check balance and sequence.

Such prescriptive theories of planning are common in education, although relatively little is known about how teachers actually plan, There has been much debate in educational circles about elements of the "engineering" point of view such as "behavioral objectives," but there have been few empirical investigations of classroom teachers to examine whether this point of view is an accurate portrayal of how teachers can and do function in the classroom.

One of the benefits of a detailed analysis of the planning process may be a better understanding of methods and procedures that classroom teachers can realistically use. Critics of the engineering view argue that one of its major weaknesses is its oversimplified image of what actually goes on in the classroom. They argue that it ignores features of the classroom environment mentioned above such as simultaneity, immediacy, multidimensionality, and unpredictability. They also argue that the engineering view overlooks such potentially important aspects of teaching as the teacher's interest in the stylistic and artistic qualities of his or her own performance.

An important outcome of investigations focusing on the planning process may be models of teacher planning that are known to reflect the teaching environment and the abilities and concerns of teachers. One might argue against this procedure by stating that what "is" in teaching is not necessarily what "should be." The approach taken in this study is not in opposition to this statement, but rather is based on the belief that it is important to examine and describe the behavior of experienced and successful practitioners who have developed strategies and methods for functioning effectively in the teaching environment. It is argued that models of planning based on what is

possible in the classroom will in the long run be more effective than more efficient models "borrowed" from other fields that are too difficult and complex for most classroom teachers to implement. In this manner, descriptive models of teacher planning can lead to prescriptive models for preservice and inservice teacher training.

The potential importance of teacher planning for effective teaching, the potential for portraying teacher planning as decision making, the lack of knowledge about how experienced teachers actually plan, and the potential importance of more accurate and effective planning models for teacher training are the central reasons for pursuing this study of teacher planning. The primary problem of the present study is to investigate and describe the decision processes involved in planning for instruction.

Purpose

The major purpose of this study is to investigate teacher planning by a detailed examination and description of the decision processes involved in one elementary teacher's planning during a five month period of instruction. The specific objectives of the study fall under two major categories. The first category includes questions about the planning process itself:

1. What different kinds of planning decisions does the teacher make?
2. What are the relationships, if any, among these decisions?
3. What information or cues are gathered and processed by the teacher to make planning decisions?
4. What is the major "unit" or element that the teacher thinks about when planning?

5. What are the general strategies and processes of the teacher's planning, and how might these processes be represented in a decision model?

The second set of questions addresses those special problems and concerns related to conducting descriptive information processing research in complex naturalistic settings:

6. How useful are ethnographic methods for studying classroom decision making?

7. What is the usefulness of "process tracing" methods for modeling teacher decisions?

8. What are the advantages and limitations of various structured and unstructured methods for collecting planning data in the preactive phase of teaching?

9. How successfully can a "moderate fidelity" judgment or In-Basket type task be used to supplement preactive and interactive classroom data collection strategies?

In addition to these questions, a goal of this study is to generate further questions about teacher planning and indicate potentially fruitful areas for future study. It is the intent of this study not to test specific research hypotheses, but rather to generate hypotheses about teacher planning and, if possible, weave them into a model of teacher planning that might be tested and elaborated by further study. Because of the huge gaps in our knowledge about teacher decision making, there is no way in which this study can be much more than a first step towards understanding the determinants and processes of teacher planning decisions.

Overview of the Study

Chapter II consists of a review of the pertinent literature on planning theory in fields outside of teaching as well as a comprehensive review of the literature on curriculum and teacher planning in

education. In Chapter III, method is discussed including the scope of the study, the selection of the teacher, data collection, and analysis. Chapter IV presents a description of the setting in which the study took place to provide a backdrop for later descriptive analysis. In Chapter V, two features of the teacher's "technology" of teaching, instructional activities, and routines are discussed; and in Chapter VI, a structural model of preactive planning is described. Chapters VII and VIII represent an attempt to develop a theoretical model of the planning process. Chapter VII discusses psychological research on deliberative, planning-related tasks in fields other than education. Chapter VIII presents a theoretical model consistent with the data discussed in Chapter VII and with the data collected in this study. Chapter IX includes a comparison of the findings of this study with those of previous planning studies, questions for future research, and implications for teacher training. A summary and conclusions are presented in Chapter X.

CHAPTER II

REVIEW OF THE LITERATURE

Organization

It has only been within the last ten years that planning has become an area for empirical study in research on teaching. Prior to this, those studying planning in education were primarily concerned with curriculum planning. The process of planning has been, however, a subject of serious study in areas such as economics, business, city planning, and national planning since the mid-1930's. This literature will be reviewed because of the volume of theory and research on planning in these other areas and their influence on theories of educational planning.

The chapter begins with a discussion of the efforts to arrive at a definition of planning in areas outside of education and then presents the definition of planning that will be used in this study. Second, the planning literature in other areas is discussed, focusing on theory and research that have viewed planning as rational decision making. Third, the planning literature in education is reviewed and discussed.

A Definition of Planning

Interest in planning is as old as man's interest in relating knowledge to action. This can be traced back to Roman, Greek, and Middle Eastern cultures and might historically be found in the study

of government, law, administration, and public works. The systematic theory of the relation of knowledge and action has been traced back to the beginnings of urban civilization when a priesthood schooled in magic and astronomy sought to mediate between heaven and earth by extending heaven's mandate into the affairs of men (Wheatly, 1971). The modern study of planning, however, has had more modest intentions (in most cases) and has been an object of theory and inquiry since the Great Depression. The myriad definitions of planning that have sprung up in the literature of planning will be discussed under two general headings: those approaches that define planning as design, and those that define planning as process.

Planning as Design

The word plan is derived from the Latin word planum, or level ground, and is commonly thought of as a drawing or diagram drawn up on a flat surface, such as a chart or blueprint. In this sense, the planner draws a blueprint, the design of which is completed before any steps are taken to realize its intentions. This is the kind of planning characteristic of architecture and is the source of such definitions as, "Planning results in blueprints for future development; it recommends courses of action for achievement of desired goals" (Bollens and Schmandt, 1965).

Planning as Process

Because of the tendency of deductive plans to decompose into smaller, more manageable parts or to distort reality when applied to complex, dynamic systems, those who study planning have become more interested in process than in states. Planning has come to pertain

not to some idealized future, but to the mode of moving from the present (Peterson, 1965). Thus, most planning theories of today are procedural theories or theories of process.

When viewed in this manner, planning can be generally defined as an activity centrally concerned with the linkage between knowledge and organized action (Friedmann and Hudson, 1974). One school of thought within planning theory characterizes the link between knowledge and action as rational decision making. This viewpoint is illustrated by the following definitions:

> Planning may be simply regarded as reason acting on a network of ongoing activities through the intervention of certain decision structures and processes (Friedmann, 1967).
>
> We define planning as a process for determining appropriate future action through a sequence of choices...Each of these choices requires the exercise of judgment; judgment permeates planning (Davidoff and Reiner, 1962).
>
> Planning is rational, adaptive thought applied to the future and to matters over which the planners or the administrative organizations which they are associated have some degree of control (Simon, Smithburg, and Thompson, 1950).
>
> Planning is more and more regarded as equivalent to rational social action, that is, as a social process for reaching a rational decision (Dahl, 1959).
>
> (Planning is) careful, deliberate, systematic and formal decision making (Argenti, 1974).
>
> Planning is the process of preparing a set of decisions for action in the future, directed at achieving goals by optimal means (Dror, 1963).

A second school of thought has arisen in opposition to the "rational-comprehensive" (Lindblom, 1959) view of planning that the above definitions portray. This position has developed largely as a result of the difficulties and inadequacies of the pure rational model for accurately describing planning behavior. This viewpoint will be

referred to in this chapter as "practical rationalism" and is illustrated by the following definitions:

> (Planning is) pragmatic and piecemeal and never comprehensive and complete, (and usually constitutes) compromise solutions of pressing practical issues (Myrdal, 1960).
>
> ...the planner may see himself as reasonably extending the domain of bounded rationality, as opportunity affords. If so, he is not a practical man, at least not enough to pride himself on it; he is not a rationalist, at least not enough to have rationalized too much of himself or others; perhaps he is a practical rationalist, or better, a rationalistic practitioner (Seely, 1962).
>
> The plan initiates a course of action which produces events experienced by the agent, in the light of which he modifies the plan; so that, in a sequence of phases, the plan is continuously initiating action or being modified by the results of action; and this modification is not merely a more efficacious employment of means to an originally intended end..., but also a modification of the end of view, a revision of intention, a recasting of desires, a development in understanding (Blackham, 1961).
>
> (Planners) might be better defined as practical artists, artists with reference to purpose, rational artists..., or artists of rationality with reference to human activity (Seeley, 1962).

The main interest of this study is to examine the mental processes involved in teacher planning. Since there is little empirical evidence to support specific deliberation processes in planning, most of the preceeding definitions are inadequate as a starting point for this investigation. There are few psychological definitions of planning available. One of the oldest and most well known definitions of a plan is that of Miller, Galanter, and Pribram (1960). "A plan is any hierarchical process in the organism that can control the order in which a sequence of operations is to be performed." Recently Bobrow (1975) has referred to planning as "a search for a series of actions to bring about a particular world-state." The definition that will be

initially used in this research study is similar to the definition of planning suggested by de Groot (1965). For the purposes of this investigation, planning is referred to as a process of preparing a framework for guiding future action. It can be seen from this definition that planning is regarded as a process strongly oriented towards future action. It is oriented towards action rather than, say, knowledge or self-development, and the fact that this action is in the future introduces the problem of uncertainty and unpredictability. It is assumed that the planning process involves decision making and judgment. At this time, however, no claim is made regarding the "rationality" of either the process or the resulting framework.

Planning Theory

It is not the intention of this section to attempt a comprehensive review of the planning literature outside of education. This has been amply and effectively done by others.[2] The purpose here is to discuss that part of planning theory that Friedmann and Hudson (1974) refer to as "the tradition of rationalism." This school of planning has had as its primary concern the problem of how decisions can be made more rationally. Until recently, this has been the predominant tradition in planning theory, so much so that, for many, planning has become synonymous with rational decision making. This tradition is of special interest to the study of teaching since it has been concerned with individual decision making in complex social situations such as economics, management, and city planning.

---

[2]For example, Dykman (1961) and Friedmann and Hudson (1974).

Rational decision models are rooted in the Utilitarian foundations of modern economics. Economics begins with the premise that people act rationally with a goal to optimize something. Historically, economics has been concerned with such things as optimum allocative efficiency, optimum product factor relationships, and optimum degrees of specialization. Much of modern economic theory has been involved with the search for the rule that would locate the position of optimal decisions. The paradigm for decision making that has grown out of this work requires:

1. The setting of goals,
2. The formulation of alternatives,
3. The prediction of outcomes for each alternative, and
4. The evaluation of each alternative in relation to the goals and outcomes.

This view of "economic man" was first challenged by Herbert Simon in his now classic book Administrative Behavior (1957 a). His thinking was influenced by Chester Barnard's (1938) work and was chiefly concerned with the limits of rationality in human social behavior. Simon proposed a model of rational choice that differed from previous notions on two specific points:

1. While economic man maximizes - selects the best alternative from among all those available to him; his cousin, whom we shall call administrative man, sacrifices - looks for a course of action that is satisfactory or "good enough"...
2. Economic man deals with the "real world" in all its complexity. Administrative man recognizes that the world he perceives is a drastically simplified model of the buzzing, blooming confusion that constitutes the real world. He is content with this gross simplification because he believes that the real world is mostly empty - that most of the facts of the real world have no great relevance to any particular

> situation he is facing, and that most significant chains of causes and consequences are short and simple...He makes his choices using a simple picture of the situation that takes into account just a few of the factors that he regards as most relevant and crucial (Simon, 1957 a, pp. xxv-xxvi).

Thus, Simon retained the general paradigm mentioned above with two major modifications. First, the criterion by which decision are made was changed. Rational man became a satisfier who makes choices without specifying and examining all the alternatives rather than a maximizer searching for an optimal or maximal solution. Second, the decision maker no longer had to deal with the real world in its totality and interrelatedness but could just deal with those "strategic factors" (Barnard, 1938) of a situation, enabling him to reduce the demands on his capacity for thought and use relatively simple rules of thumb. These ideas were further elaborated by Simon in a book on organization behavior co-authored by James March (March and Simon, 1959). Here, they elaborated the notions of "satisficing" and "bounded rationality." March and Simon identified planning as decision making but failed adequately to distinguish planning from decision making in general.

The first practical application of Simon's model was undertaken by Jan Tinbergen (1952, 1964). He devised an econometric model for economic policy analysis that was used for short range planning in the Netherlands and for National Planning under the directions of the United Nations. While this model of planning was gaining wide support, several empirical studies focusing on the application of the rational model in city and national planning began to reveal some gross deficiencies of the method. Meyerson and Banfield's (1955) case study of public housing in Chicago found the realities of urban planning

practice to fall far short of the rational-comprehensive model of planning. Also, a large number of empirical studies of national planning (e.g., Gross, 1965; Hirschmann, 1967; Faber and Sears, 1972) found little success in using a rational planning model to generate significant developmental action at the national level. The impact of these studies on rational planning theory has been summarized by Friedmann and Hudson (1974):

> Rationalism had largely ignored the experience of planning practice, as indeed it had ignored the work of organization development theories. And for good reason, for the recorded experience with planning threatened the very foundations of rationalist thinking. While rationalism argued a thin logic from the first principles to derive the basis for rational choice, empiricists labored to discover how "real" planning worked or did not work - and why. And what they discovered - if nothing else - was that planning-in-practice did not look at all like planning-in-theory (p. 12).

Proponents of the rational planning method have had to come to grips with three major problems--reasons that planning-in-theory breaks down in practice. The first reason is the complexity and "turbulence" of most planning environments. Rational models were developed on simple problems or assumed that alternative courses of action were either given or obtainable and that the outcomes or consequences of each alternative were either specified or calculatable. Most of these assumptions are unrepresentative of social settings because of the complexity, uncertainty, and multidimensionality of social interaction. It rarely is possible for a decision maker to determine all possible courses of action (or even known when one has done so) or to predict the consequences of various alternative actions.

The second reason rational planning theory breaks down in practice involves the limits on knowledge available during planning. In

any given situation, there are limits to the information available to a decision maker. The complexity of most planning situations makes extraction of knowledge from the environment difficult. Even enormous data banks do not reduce the problem since they create further problems of classification, search, and aggregation. The problem of knowledge is compounded by the difficulty of untangling means from ends and the difficulty of establishing values for various alternatives. The non-repetitiveness of many planning situations and changes brought on by the passage of time are additional factors that place limitations on knowledge available during planning.

The third difficulty rational planning has failed to face is that of limited human information processing capabilities. Rational models require that decisions be based on optimal or maximal criteria that use as information probabilities and utility functions. Models such as Simon's reduce this demand somewhat, but still assume a comprehensive approach to the problem. This presents the difficulty of determining goals at the outset and evaluating alternatives in light of goals and outcomes. In effect, what this implies is that decision makers when confronted with a decision will start from fundamentals anew each time and build from the ground up.

These difficulties of the rational-comprehensive model of planning were quickly recognized by several theorists. One of the earliest and best known alternatives proposed was Lindblom's (1959) "successive limited comparisons" presented in a paper entitled "The Science of Muddling Through." He argues that, in practice, policy makers consider relatively few values and relatively few alternative policies and proceed in decision making by "building out of the

current situation, step-by-step and by small degrees" (Lindblom, 1959). Lindblom proposes that in most situations means-ends analysis is of limited value or even inappropriate, since the selection of goals and the empirical analysis of alternatives are often tightly intertwined. He argues that in deciding between two policies, a decision maker focuses his attention on the marginal or incremental values, being concerned only with those increments by which two alternatives differ. Finally, Lindblom's method proceeds not by a comprehensive analysis of the situation in hand, but by a chronological series of successive approximations towards a desired objective, that is, a series of "successive limited comparisons." Lindblom proposed a modification of this method in his book The Intelligence of Democracy (1965). Here he argues that the preferred social good is determined by an incremental decision process he refers to as "mutual adjustment."

Lindblom was criticized for his failure to acknowledge the importance of structural decisions in planning and this criticism led to much debate about the relative importance of "big" and "little" decisions. This debate was put to rest by Etzioni's (1967, 1968) notion of "mixed scanning." Here effective decision making is based on a strategy that combines synoptic and incremental decision strategies. Etzioni proposes that effective decisions combine what he calls "contextuating" decisions with "bit" decisions. Contextuating decisions are those fundamental decisions that are made through an exploration of the main alternatives of a situation omitting details so that an overview is possible. Bit decisions are made incrementally within the

contexts set by the fundamental decisions. The relationship that he suggests between the two strategies is that:

1. Most incremental decisions specify or anticipate fundamental decisions, and

2. The cumulative value of the incremental decisions is greatly affected by the underlying fundamental decisions (Etzioni, 1968, p. 289).

There have been no published empirical studies of planners using either Lindblom's "successive limited comparisons" method or Etzioni's "mixed-scanning" strategy. Most of the empirical work in planning theory has been limited to case studies showing the inadequacies of rational-comprehensive planning methods. It is a purpose of this study to throw further light on these strategies, not by testing them specifically, but by describing planning decisions in an environment not unlike those that have been studied outside of education. Teacher planning probably contains elements common with the planning conducted by architects and designers, public and private administrators, policy analysts, and urban and city planners.

Planning in Education

Until recently, the literature on planning in education has been mainly prescriptive. Many volumes have been written recommending specific principles for curriculum planning[3] and most recent methods textbooks include at least one chapter on teacher planning. Within the last several years, researchers have become interested in how teachers plan in the classroom and have begun investigating the relation

---

[3]See, for example: Anderson (1956), Caswell and Campbell (1935), Gwynn (1943), Krug (1950), Sayior and Alexander (1974), and Varduin (1967).

between planning and classroom teaching and learning. Both of these areas of discourse and inquiry will be discussed in this section, beginning with the prescriptive planning literature and followed by the research literature on teacher planning.

Prescriptive Planning Literature

Most of the work in curriculum planning to date has focused on a model of curriculum planning first proposed by Tyler (1950) and later elaborated by Taba (1962) and Popham (Popham and Baker, 1970). This model recommends four essential steps for effective planning:

1. Specify objectives.
2. Select learning activities.
3. Organize learning activities.
4. Specify evaluation procedures.

This model is basically a rational means-ends model in which a planner's first task is to decide on the desired ends, or what is to be accomplished, and then select the appropriate learning activities to accomplish them. Curriculum planning is characterized as a task that requires orderly and careful thinking, and this model is proposed as a rational and scientific method for accomplishing this task (Taba, 1962).

The central decisions in this model are choices concerning objectives and choices concerning content and activities. The formulation of clear and comprehensive objectives has been considered by many to be the "essential platform for the curriculum" (Taba, 1962) which may be the reason behind the extensive debate among proponents of various methods for stating instructional objectives (see, for example,

Popham, Eisner, Sullivan, and Tyler, 1969). Although the statement of objectives is advocated by nearly all curriculum theorists, the statement of objectives in behavioral form has dominated most planning models. Within this model, theorists seem to be in greatest disagreement in relation to the specificity and observability of the behavior included in the objective. Whereas earlier theorists portrayed the formulation of objectives in a more general, developmental, and fluid context, more recent proponents of behavioral objectives (e.g., Mager, 1962; Gagné, 1965) advocate a very specific, linear, and operationally oriented process of objective development.

Choices concerning content and activities are becoming more important with the enormous increase in available materials and activities and with increased public interest in what is being taught in the schools. The major criterion for selection of activities that is implied in the rational model of curriculum planning is the degree to which various content and activities lead to the accomplishment of the desired objectives. Additional criteria for this decision have been proposed such as validity and significance of content, consistency with social realities, balance of breadth and depth, provision for wide range of objectives, learnability and adaptability to experiences of students, and appropriateness to the needs and interests of the students (Taba, 1962). These additional criteria are proposed as a screen through which each activity would be sifted, but how each of these potentially complicated judgments are to be made by the planner is not specified.

In general, curriculum planning is currently viewed as an orderly, rational, deliberative process that can be most effectively

accomplished by using a rational, "ends-means" type of model (Zahorik, 1975). It is interesting that this type of model, which may be appropriate for planning at the more general curricular level, is the same model that is most often prescribed for teacher planning at the classroom level.

In most elementary methods textbooks, planning for teaching is defined within the following framework:

> A plan for teaching, like a plan for a house, for losing twenty pounds of weight, for winning the conference championship, or for a vacation serves as a guide to selecting activities, actions, and decisions as one attempts to move from where he is to where he wants to be - to his goal(s)...The plan developed by the teacher is his best estimate of the most direct route to reach educational objectives and is made prior to embarking on a lesson (Collier, Houston, Schmatz, and Walsh, 1967, p. 115).

Although various types of long term and short term planning are usually discussed in textbooks, the process of planning proposed always takes the form of (1) state objectives, (2) select and organize the materials, procedures, and techniques to be used to achieve the objectives, and (3) specify evaluation procedures to determine whether objectives have been attained. When discussing planning for instructional units, Beauchamp (1965) presents four plans developed by others for organizing a unit, all of which contain the above components. Peterson (1964) presents the same procedures for planning specific lessons.

The only departure from this rational model of teacher planning that has been advocated is the "integrated ends-means model" (Zahorik, 1975) suggested by McDonald (McDonald, 1965; McDonald, Wolfson, and Zaret, 1973) and Eisner (1967). They propose that teachers do not

begin their planning by thinking about objectives and then proceeding to decisions about activities, evaluation, and so forth; rather, teachers first focus on the type of learning activity that will be provided for the students. They argue that objectives arise and exist only in the context of an activity, as a result of students' choosing their own learning experiences and pursuing their own objectives. Thus, in this model, ends for learning become integrated with means for learning and the specification of goals prior to an activity becomes meaningless.

With the exceptions of McDonald and Eisner, the steps that are advocated for rational curriculum planning and rational instructional planning are the same. The same model has been proposed for decision making from the most comprehensive curriculum planning project down to planning for tomorrow's social studies lesson. There has been little attention paid to the process other than its proper sequence, resulting in few guidelines for making the complex judgments and decisions at each point in the model. In effect, what appears to have happened is that education has borrowed the rational ends-means decision making model from other fields and has prescribed this procedure as the most effective and efficient method for <u>all</u> educational planning. Because of the improved efficiency that this model has brought to curriculum planning, fiscal planning, and so forth, educators have not questioned the appropriateness of this procedure for classroom planning. The question of whether teachers <u>do</u> plan in this manner has been overlooked, along with the more important question of whether teachers <u>can</u> or <u>should</u> plan in this manner.

The answers to these questions have immediate and practical importance since the rational planning model is accepted by most teacher educators. It has become part of most materials directed at improving teacher education and has become central to most materials directed at improving teacher planning skills (e.g., Joyce, et al., 1971; Taba, 1966). Morine (1973) has aptly summarized the state of current training for classroom planning:

> Teacher educators may agree that planning is an essential part of teaching effectiveness. Judging from the scarcity of training materials, it is questionable whether the educational world at large concurs with this view. Training materials for planning skills begin and end with diagnosis and the writing of behavioral objectives...The materials may be systematic, but they are hardly comprehensive (p. 135).

Teacher Planning Research

Although researchers such as Philip Jackson have long pointed to the importance of looking at teacher behavior in the preactive setting, relatively few studies have ventured into this domain. Empirical studies of teacher planning have only been conducted since 1970, and, to date, the published studies can still be counted on one hand. There are basically two types of research on teacher planning. The first type has focused on testing the adequacy of the rational planning model for describing what teachers do and has examined the effect of using this model on teacher classroom behavior. The second type of study has attempted to describe how teachers actually plan, free from the constraints of any recommended procedure.

Zahorik (1970) did the first empirical study of classroom planning when he examined the effect of structured planning on teacher classroom behavior. He provided six of his sample of twelve teachers

with a partial lesson plan containing behavioral objectives and a detailed outline of content to be covered two weeks hence. He requested the remaining six teachers to reserve an hour of instructional time to carry out a task for the researchers, not telling them that they were going to be asked to teach a lesson on credit cards until just before the appointed time. Zahorik analyzed recorded protocols of the twelve lessons focusing on "teacher behavior that is sensitive to students." He defined this behavior as "verbal acts of the teacher that permit, encourage, and develop pupils' ideas, thoughts, and actions." Upon examining the protocols of the planners and non-planners, Zahorik noted that teachers who planned exhibited less honest or authentic use of the pupils' ideas during the lesson. He concluded from this that "the typical planning model--goals, activities, and their organization, and evaluation--result in insensitivity to pupils on the part of the teacher." These results must be interpreted cautiously because of the size of the sample, the length of observation, and the lack of control for or description of the content taught or of the teacher's normal teaching style. The study does, however, raise interesting questions about the effect of a teacher's planning method on the way one reacts in the classroom.

Zahorik (1975) continued this line of inquiry by examining the use of behavioral objectives and the "separate means-ends" model of planning as well as the use of the "integrated means-ends" model proposed by McDonald and Eisner. He asked 194 teachers (primarily grades K-12) to list in writing the decisions that they make prior to teaching and the order in which they make them. He classified these decisions into the following categories: objectives, content,

activities, materials, diagnosis, evaluation, instruction, and organization. He found that the kind of decision used by the greatest number of teachers concerned pupil activities (indicated by 81% of the teachers). The decision most frequently made first was content (51%) followed at a distant second by objectives (28%).

Zahorik concluded from this study that teacher planning decisions do not always follow logically from a specification of objectives, and that, in fact, objectives are not a particularly important planning decision in terms of quantity of use. He also argued, however, that the integrated ends-means model does not appear to be a functioning reality because of the relatively few teachers (only 3%) who began their planning by making decisions about activities.

Several things should be kept in mind when interpreting the results of this study. First, the data are based on teacher self-reports. Second, there is no indication of what Zahorik meant by planning decisions or how the teachers interpreted its meaning. Third, there is no evidence that the classification system used by Zahorik reflects the types of decisions actually made by teachers. For example, it may not be true that decisions concerning activities and decisions concerning content are easily separated in the teacher's mind. It may be that content is an essential component of a learning activity and if the content is changed the nature of the activity is changed.

Only recently has research on teacher planning begun focusing on describing teacher decision making in actual planning situations. Peterson, Marx, and Clark (1977) examined planning in a laboratory situation as twelve teachers prepared to teach an unfamiliar

instructional unit to a group of eight students (also new to the teachers). During the planning period, teachers were instructed to "think aloud" and their verbal protocols were later coded by means of decision categories such as objectives, materials, subject matter, and process. As in Zahorik's (1975) study, there was no indication whether these categories accurately captured the teachers' actual perceptions of the planning situation. The following results were obtained from this study based on protocols from the planning periods prior to three days of teaching (fifty-minute periods): (1) teachers spent the largest proportion of their planning time dealing with the content (subject matter) to be taught, (2) after subject matter, teachers concentrated their planning efforts on instructional processes (strategies and activities), and (3) the smallest proportion of their planning time was spent on objectives. All three of these findings were consistent with those by Zahorik (1975) and Goodlad, Klein, and others (1974). The third finding is also similar to results reported by Joyce and Hartoonian (1965) and by Popham and Baker (1970). Also reported in this study were results suggesting individual differences in cognitive processing styles and abilities in planning that were relatively stable during the experimental period.

A major weakness of the study is that it was conducted in a laboratory situation, with students and materials that the teachers were dealing with for the first time, and planning was only observed for ninety minutes prior to the lesson. Also, planning was only observed over a three-day period. It is possible that this type of task may offer little information about how planning might proceed when the teacher is in his or her own classroom, with familiar students,

materials, and resources. Peterson, Marx, and Clark did, however, point to the richness of descriptive data that may be obtained by observing actual planning and also suggested the usefulness of thinking aloud as a method to elucidate the teacher's thought processes.

Morine (1976) avoided some of these problems by studying planning in a semi-controlled classroom setting and in a simulated planning situation. Teacher written plans were collected for two experimenter-prescribed lessons (one in mathematics and one in reading) and analyzed according to (1) specificity of written plans, (2) general format of plans, (3) statement of goals, (4) source of goal statements, (5) attention to pupil background and preparation, (6) identification of evaluation procedures, and (7) indication of possible alternative procedures. Morine found that teachers tended to be fairly specific and use outline forms in their plans, yet paid little attention to behavioral goals, diagnosis of student needs, evaluation procedures, and alternative courses of action.

In the simulated setting, Morine had teachers plan a reading program for fourteen new students. The task was designed to identify the kind of information teachers consider important for planning a program for a school year. Information was available from cumulative records for each student, and the resulting plans were analyzed according to the types of information about pupils that teachers requested, grouping procedures used, and the differential use of materials and support services. Morine found that a majority of the teachers indicated that there were major differences between the way that the simulation was constructed and the way that they normally planned. The major difference reported was that they normally avoided so much preliminary

information about students or try to get first hand information (e.g., give their own tests). Morine found that as a group the teachers tended to ask for the same kind of information, were fairly accurate in identifying the pupils' reading levels, and differed little in grouping practices and use of support services.

Currently, Morine and Joyce (1976) are involved in a study investigating, among other things, the preactive planning of a group of teachers at different times during the school year using four different methods of data collection. Planning will be examined using thinking aloud technique, a post teaching interview, and structured and unstructured written lesson plans.

Although decision making has been a concern of nearly all the empirical studies that have been discussed thus far, they are all characterized by the following weakness. None of the studies has examined teacher planning in the classroom over long periods of time. Recent investigators such as Morine and Joyce have begun examining planning in naturalistic settings, but their observation and description have been limited to one or two days per month for each teacher. To date, no one has taken on the task of describing teacher planning in detail over an extended time period. Moreover, there has been no attempt to describe the process of teacher planning decisions as they occur. Typically, an analysis has been made from the product of teacher planning, that is, lesson plans. Peterson, Marx, and Clark (1977) have conducted the only study of teacher planning as it happens and then only for three ninety-minute periods. Finally, although Zahorik has compared teacher planning to prescribed models of teacher planning, no

one has attempted to develop a model of teacher planning from actual planning behavior in a naturalistic setting.

It is because of these weaknesses in research on teacher planning and decision making that the present study has been undertaken. Teacher planning was examined as it naturally occurred in the classroom setting over a period of several months. The resulting behavior was described in detail and models of teacher planning were developed.

CHAPTER III

METHOD

Scope of the Study

The primary objective of this study was to describe those mental processes involved in teacher planning decisions made prior to teaching. This objective was addressed within the context of a case study focusing on a detailed examination and description of one elementary teacher's planning decisions during a five month period of instruction. The central thrust of the study was descriptive with a major purpose of providing a "thick-description" of the teacher and the classroom setting in which she functions. There is no attempt in this study to examine the relationship between teacher planning and either classroom interaction or student outcomes. These process-product relationships (Dunkin and Biddle, 1974) were ignored because it was felt that before the effects of planning decisions on classroom interaction and student learning can be understood, we need to describe and understand what actually occurs during the planning process. Although major interest was in describing planning behavior as it naturally occurs, teacher planning was also examined in a simulated setting in which certain aspects of the teacher's present environment could be manipulated.

The study began in January, 1977, and was concluded in June, 1977. During the first three months of the study, the investigator was present in the classroom on the average of four days per week. During

these days he observed the teacher from 8:30 in the morning until she left school at 4:45 in the afternoon. The fourth month of the study involved only occasional visits to the classroom while the data were being analyzed and while the theory and models were being developed. The fifth month of the study involved several more weeks of observation (usually half days) and the teacher's participation in the planning simulation.

Selecting the Teacher

Before the study began, four criteria were established to guide the search for a participant in this study. First, an experienced teacher was sought so that planning could be observed that had proved workable and effective for the teacher over a period of several years. Second, a teacher who did a great deal of overt planning was desired, since it would be easier in an initial study of teacher planning to begin with a teacher whose planning activities were more readily observable. The third criteria was to look for a teacher who was regarded as being successful by other professionals--a "good" teacher. This was thought to be important since good planning was of primary interest at this time and would be of more value if one wanted to make prescriptions to other teachers' planning behavior. Finally, a self-contained classroom was sought so that the teacher would not be sharing planning responsibilities with other teachers.

In the first week of January, several potential teachers were identified through the recommendations of teachers currently working at the Institute for Research on Teaching. Two teachers were contacted and appointments were arranged to discuss the study. The first

teacher expressed interest in participating in the study and agreed that a final decision on her participation would be contingent on both the investigator's and her willingness to proceed with the study after three days of classroom observation and interaction. The second teacher turned out to be in a team-teaching situation, and it was decided to make a decision about the first teacher before contacting others.

After the observation period, the teacher agreed to participate in the study, and it became apparent to the researcher during this time that she met all of the specified criteria for a participant in the research. The teacher was teaching in a combined first and second grade classroom in a local school district. She had had six years of teaching experience, three years in a special education classroom and three years in a first and second grade "split" classroom in the present building. She appeared to be a very organized and creative teacher who spent much time in planning activities and was highly regarded by her colleagues. She was in her early thirties and had earned a bachelor's degree in social work and a master's degree in special education prior to teaching.

Naturalistic Data Collection

A central purpose of this study was to examine and describe planning decisions as they were made in the classroom setting. Two methods of inquiry were chosen to accomplish this. The first method, process tracing, is an approach to describing decision making that has proven successful in relatively simple laboratory and field settings but has never been tested in a complex naturalistic setting. The

second method was micro-ethnography (Smith and Geoffrey, 1968) which has been widely used to examine the social environment of groups but has only once been used as a tool to examine teacher decision making. Each of these methods will be discussed in turn.

An Information Processing Approach

While the major purpose of this study is to describe the mental processes involved in teacher planning decisions, it is also concerned with examining the usefulness of a particular mode of inquiry that has proven successful in studies of decision making in other fields. This approach, called process tracing, begins with a complex representation of decision making in the form of verbal protocols and attempts to simplify the processes by representing the decisions in the form of decision trees or flow diagrams.

Most researchers using this methodology subscribe to the notion that humans are adaptive, goal oriented systems. Simon (1969), elaborating on this view, states that:

> A man, viewed as a behaving system, is quite simple. The apparent complexity of his behavior over time is largely a reflection of the complexity of the environment in which finds himself (p. 25).

It is this view of "thinking man" that provides both the theoretical and methodological foundation for this study of teacher decision making.

Viewing man as a relatively simple, adaptive system has certain implications for the ways in which human information processing should be studied. Newell (1973) has suggested that to predict a person's behavior, one must have information about (1) his goals, (2) the structure of the task environment in which he is functioning, and (3) the

invariant structure of his processing mechanisms. Using this information, one can fairly accurately predict what "methods" are available to the subject, and from the method one can predict what the subject will do.

In order to utilize Newell's formula, the researcher must take pains to describe the subject's goals and the structure of the task environment for each new situation. One assumes, however, that there are certain invariant structures of the human processing mechanism across situations, and that only a gross knowledge of these processes is needed. Simon (1969) has summarized these processes as follows:

> The evidence is overwhelming that the system is basically serial in its operation: that it can produce only a few symbols at a time and that the symbols being processed must be held in special, limited memory structures whose content can be changed rapidly. The most striking limits on subject's capacities to employ efficient strategies arise from the very small capacity of the short-term memory structure (seven chunks[4]) and from the relatively long time (five seconds) required to transfer a chunk of information from short-term memory to long term memory (p. 53).

The process tracing approach has proven manageable and effective for understanding behavior during relatively simple tasks such as cryptarithmetic or chess problems (de Groot, 1965; Newell and Simon, 1972). In these situations both the goals of the subject and the task environment are well specified, and the researchers can focus their efforts on determining the "methods" or "programs" that the subject is using to solve the problems. The investigator's job becomes more difficult, however, as the task environment increases in complexity.

---

[4]This estimate was based on Miller's (1956) estimate of short-term memory (STM) of approximately seven chunks, plus or minus two chunks. More recent work on STM (Craik, 1971) has lowered this estimate to three chunks, plus or minus one.

This has been shown to be true in studies of physicians' diagnostic problem solving (Elstein, et al., in press) and in attempts to describe the decision making of bank trust investment officers in naturalistic settings (Clarkson, 1962).

Elstein and his colleagues set out to describe the cognitive processes of physicians from their initial encounter with a patient to the final diagnostic decision. Physicians were confronted with simulated patients in a simulated office situation,and data were collected on their "thinking aloud" during the encounter as well as their comments during simulated recall (Bloom, 1954; Kagan, et al., 1967) of the session. By repeating the same simulations on twenty-four physicians, the major features of the task environment became well understood. The protocols and stimulated recall provided information about the physicians' goals and intentions. Thus, they were able to complete Newell's formula and their study provided interesting and unexpected information about the methods that the physicians were using to solve these problems.

Clarkson examined the decisions of a bank trust investment officer as he selected investment portfolios during a period of several months. He used a variety of data collection methods, illustrating "the slow, painstaking, and frequently artful manner in which 'thinking aloud' and other process data are collected and transformed into information processing models" (Shulman and Elstein, 1975). He began his study by interviewing the bank's trust investment officers and by attending departmental meetings that reveiwed past and future trust investment decisions. He then focused on the deliberations of one investment officer, examining the history of several accounts and

attempting to develop "naive behavioral models" of those decision processes that seemed to be invariant across accounts.

In an attempt to test these models, "think aloud" protocols were made of the trust officer's successive deliberations during the course of his work. Inspection of these protocols indicated that many of the decisions pertaining to expectations and valuation of stocks, industries, etc., were made prior to portfolio selection. To discover how these prior decision were made, protocols were gathered while the trust officer read and commented on articles from financial journals and on analysts' reports to which he subscribed. From these protocols and those collected earlier, a model was constructed of the trust officer's decision processes, eventually being developed into a computer simulation. Over a validation period of six months the computer simulation successfully matched the predictions of the trust officer, and appeared to be using approximately the same deliberative processes as used by the human decision maker.

These two studies illustrate well the information processing approach to examining decision making. Here the subject is viewed as a processor of information capable of being simulated by a sequential decision making model. There are a number of benefits from this information approach: (1) it provides a formal language for dealing with complex problems, and as such, (2) it requires a precise formulation of the theory, and (3) it allows for a direct test of the model by running the program and comparing its output and processes with that of a human decision maker performing the same task (Wortman, 1972).

The application of information processing methodology to the description of teacher decision making processes promises to be a challenging and formidable task. The environment in which teachers, especially elementary teachers, daily operate is many times more complex than that of the physician or trust investment officer. This is true largely because of the fact that teachers deal with many people at one time and are in contact with them in a variety of different settings every day, over long periods of time.

One way to address the complexity of the teacher's environment is to characterize it as being composed of many different task environments in a process of constant fluctuation and change. According to Simon's earlier statements, it makes sense to think of the teacher as being effective in certain situations and with certain tasks rather than as the possesser of global or generic traits and abilities. In other words, the appropriate question to be asked in research on teaching is not "What is an effective teacher?" but rather "In what situations is a teacher effective?"

If one wishes to use Newell's "formula" to describe and predict teacher behavior, a large amount of effort must be devoted to describing and characterizing the task environment and the teacher's goals for decision making. This is one reason that this study takes the form of an in-depth process tracing of one teacher over a long period of time.

As mentioned earlier, the goal of information processing approaches such as process tracing is to describe the processes or methods by which problems are solved and decisions are made. To obtain this information, the researchers have generally relied on introspective reports gathered as participants think aloud while performing a

task. These protocols are then formalized into models representing the mental processes used by the participants while engaged in the task.

A primary source of data for this study is the teacher's verbalizations of her thought processes during instructional planning. There is much debate in psychology about how to deal with verbal data. This study takes the same approach to the issue as do Newell and Simon (1972):

> The protocol is a record of the subject's ongoing behavior, and an utterance of time t is taken to indicate knowledge or operation at time t. Retrospective accounts leave much more opportunity for the subject to mix current knowledge with past knowledge, making reliable inference from the protocol difficult. Nor, in the thinking-aloud protocol, is the subject asked to theorize about his own behavior - only to report the information and intentions that are within his current sphere of conscious awareness. All theorizing about the causes and consequences of the subject's knowledge state is carried out and validated by the experimenters, not the subject (p. 184).

In this study, the teacher was requested to think aloud through out most of her preactive teaching activities. For those deliberative planning periods such as writing down next week's schedule in her plan book or planning for a new instructional unit, her thinking aloud was recorded on audio tape. During other preactive activities, a written description was kept on her behavior, making special note of verbalizations related to planning decisions.

An Ethnograhic Approach

A second and equally important set of data collected during this study was detailed written descriptions of the teacher's behavior in both the preactive and interactive phases of teaching which provided

detailed descriptions of the environmental "context" in which planning decisions were made.

One reason for using this approach is that research on teaching has provided few in-depth descriptions of actual teaching behavior in classroom settings. The exceptions to this are the ethnographic studies done by participant observers who have spent long periods of time examining one educational setting (e.g., Cusick, 1973; Smith and Geoffrey, 1968). These studies, along with less extensive observations by researchers such as Jackson (1968), have provided valuable knowledge and insights into the nature of teaching that has been for the most part overlooked in the short and infrequent forays into the classroom that characterize research on teaching. Given this dearth of information about life in classrooms and the promise of the descriptive-ethnographic studies, it seemed that to describe adequately and understand teacher decision making, one would want to spend an extended period of time in the classroom observing the day to day activities of teaching.

Ethnographic descriptions of teaching in this study were collected as the investigator functioned as a "participant observer" in the classroom. "Participant" does not mean here that the investigator took on the role of either the teacher or a student, but that he participated in the social structure of the classroom developing significant relationships with the teacher and students. The observer's role most frequently took the form of sitting quietly at a spot in the classroom offering full view of all activities, taking written notes and recording as much of the action of the classroom (focusing on the teacher) as possible. Interactions with students were limited

primarily to friendly and informal conversations and to occasional questions about what was being written down by the observer. At times when the students were not in the classroom, the investigator functioned as the teacher's "shadow," following the teacher throughout the day and recording her behaviors and statements. During these times, the teacher was engaged in an on-going "thinking aloud" process where she attempted to verbalize her thoughts regarding the activities in whcih she was involved. Notes were kept throughout this process and questions were often asked to clarify or elaborate her statements. During more deliberative instructional planning sessions, thinking aloud was also tape recorded. By using these approaches, a detailed written description of the teacher's behavior was obtained that portrayed her planning decisions within the context of days, weeks, and months of teaching.

Another advantage of the ethnographic method is the detailed description it provides of the teaching environment. The importance of carefully describing the environment in which behavior occurs has been pointed out by both the ecological and information processing psychologists. As mentioned in Chapter I, the ecological approach to examining teaching underlines the subtle and complex interdependencies between behavior and the environment. Their notion that settings establish limits on the response options of participants suggests that an understanding of behavior in any given situation will require an understanding of the environment in which it occurs. This view is supported by information processing theory and has been most widely discussed by Newell and Simon. In their theory of thinking, they set forth the following propositions:

1. A few, and only a few, gross characteristics of the information processing system (IPS) are invariant over task and problem solver.

2. These characteristics are sufficient to determine that a task environment is represented (in the IPS) as a problem space, and that problem solving takes place in a problem space.

3. The structure of the task environment determines the possible structures of the problem space.

4. The structure of the problem space determines the possible programs that can be used for problem solving (Newell and Simon, 1972, pp. 778-779).

The third and fourth propositions of this theory suggest the important role of the task environment in shaping decision making. They suggest that the task itself must be considered a major determinant of human behavior, as opposed to attributing behavior to a stable trait or ability of the decision maker across situations.

Thus, if decision making is largely a function of the task environment, a crucial task of research becomes that of describing the situation in which the behavior occurs. These descriptions contribute to an understanding of information processing by making possible an understanding of the task requirements which, in turn, yields a better understanding of the person who performs in a more-or-less successful manner (Dawes, 1974).

Summary of the Naturalistic Data Collection

Two strategies of naturalistic data collection were used in this study. A process tracing approach was used to collect detailed information about the teacher's specific planning decisions with an emphasis on describing the decision process. In addition, a micro-ethnographic approach was used to describe the behavior and context of

teaching with a goal of providing a background from which to better understand the specific planning decisons.

The Teacher Planning Shell

During the course of this investigation, teacher planning behavior was observed in several artificial situations. The first of these situations that will be discussed has been named the Teacher Planning Shell. The Teacher Planning Shell is a moderate fidelity simulation resembling an In-Basket, although differing in one major sense. Classical teacher In-Baskets (Shulman, 1965; Shulman, et al., 1968) generally represent total task simulations. In these simulations, the participant is usually confronted with a familiar task in an unfamiliar situation. One of the major tasks confronting the participant is to familiarize oneself with the new environment and then manipulate it in some manner to achieve the desired goal(s). A weakness of these simulations is that it is nearly impossible to duplicate the information that would be internally available in real situations as a result of previous experience. (Efforts have been made to provide reference memories representing this experience, but the process of retrieving this information is often cumbersome and time-consuming.)

The Teacher Planning Shell attempts to circumvent these problems by providing a simulated situation in which a participant can use his or her current knowledge about most aspects of the task environment. This is achieved by manipulating one or two components of the teacher's environment while leaving the rest undisturbed. For instance, a teacher may be asked to plan lessons for a new curriculum component that would be implemented in his present classroom with his current

students at the present time of year. Although situation factors are not standardized and controlled as in classical In-Baskets, information on these factors can be collected by a questionnaire administered prior to the planning task.

This approach has several advantages over total-task simulations. First, the Teacher Planning Shell provides a format for planning in a semi-controlled setting that has greater task validity. By allowing the teacher to remain, for the most part, in the present teaching situation, the psychological fidelity of the task should also be increased. Second, the Teacher Planning Shell should be less difficult than most In-Baskets, in that there is less learning and searching for information that must occur prior to planning. Third, the "shell" format provides for flexibility by allowing different kinds of planning tasks and potential problems to be presented to the teacher.

For the purpose of this study, five different problems were developed that would be appropriate for use in late spring. Four of the problems were used with the teacher in this study. The instructions and problems for the Teacher Planning Shell are presented in Appendix A along with the Teacher Planning Shell Questionnaire administered prior to the simulation.

The Planning Shell was primarily designed for this study, but is constructed so that it may be used as a tool to examine teacher planning decisions outside the framework of an in-depth case study. Since an essential element of the Teacher Planning Shell is that the participant deal with the problems at the current time of the year, additional problems are being developed that would be appropriate for beginning of the year, fall, and winter term simulations.

In this study, the Teacher Planning Shell was used primarily as a tool to examine teacher planning in situations that had not been naturally observed during the observation period. The teacher was instructed to think aloud during the task and the verbalizations were recorded on audio tape. Since the Teacher Planning Shell was administered late in the study, the data were used to modify or confirm hypotheses and models that had been developed from earlier descriptions.

Judgment Tasks

During the third and fourth months of the study, the teacher was asked to participate in several small scale experiments that were designed to examine more closely the teacher's thinking about students and activities by providing information about the characteristics or cues to which the teacher paid attention. Initially, only two tasks were planned, a pupil sort task and an activity sort task. As a result of the teacher's interest in doing a sociogram on the class, a third task was added to provide additional information about teacher perceptions of students.

Pupil Sort

This task consisted of presenting to the teacher names of her students written on separate index cards and instructing her to group the pupils according to any dimension or characteristic that she could think of. No guidance was given as to what characteristics to use nor about the number of groups. The task lasted approximately forty-five minutes and the teacher was instructed to think aloud during the task. If the teacher had not done so during the task, she was requested at the end of each sort to explain how the groups differed from each

other and how the children in each group were similar. Within the forty-five minute period, twenty-two different sorts were accomplished. A list of the sort dimensions used is presented in Appendix B. The protocols were examined to determine the number of dimensions used by examining the similarity of group composition in the various sorts.

Activity Sort

The activity sort used the same procedure as the pupil sort using the names of the fifty-one instructional activities used in the classroom that had been identified by classroom observation. During the forty-five minutes set aside for this task, twenty dimensions were used as a basis for sorting. These dimensions as well as the fifty-one activities are presented in Appendix B. The analysis procedure was the same as that used in the pupil sort task.

Sociogram Analysis

During the third month of the study, the teacher expressed interest in doing a sociogram of the class. She had informally done this before and had found it to be an interesting source of information about social relations in the classroom. The investigator offered to construct the sociograms if she would decide on the questions that she would ask the students and be willing to discuss her predictions about the outcome of each sociogram prior to seeing the results. To this she agreed, and a period was set aside during class to collect the students' responses to each of the twenty questions that she had constructed. Over the weekend, the investigator constructed a sociogram for each of the questions. During the next week, these were presented to the teacher and her reactions recorded. Prior to showing

each sociogram to the teacher, the question was read and she predicted how the diagram would look. While she examined each sociogram, her reactions and the accuracy of predictions were discussed. These data were used to supplement and elaborate the information on her thinking about pupils collected in the pupil sort task. (The questions for which the sociograms were developed may be found in Appendix B.)

Analysis

Basically, two types of data were generated and analyzed in this study. During the first three months of the study detailed field notes were taken during both the preactive and interactive teaching activities that occurred on the observation days. In addition, detailed notes or audio recordings were made during the teacher's planning and during her participation in the Teacher Planning Shell and the judgment tasks.

The field notes were taken with the purpose of providing a running account of the teacher's behavior. As incidents occurred, as many features of the behavior and situation were recorded as possible. Attempts were made to record what was said, who said it, the nature and location of the activity, the participants, the noise level, tone of voice, posture, facial expression, and so forth. Obviously, in quick interchanges and fast moving activity sequences, certain things were missed. The strategy used to sort out complex situations was to focus on the teacher's behavior, only recording students' behavior as they interacted with her.

The analysis of the field notes proceeded in the following manner. At the end of each observation day, the field notes were recorded onto

cassette tapes to be later transcribed. Putting the field notes into a form that could be easily transcribed served as a review of the day's activities and provided a further stimulus to thinking about the teacher's planning in relation to classroom activities. When in typed form, the field notes were reread with the purpose of looking for broad patterns of behavior in the interactive setting that seemed related to planning decisions. As the study progressed, the field notes became the background for interpreting planning behavior, since they illustrated the various factors that seemed to be influencing the planning of classroom activities as well as shedding light on the factors that effected the implementation of the activities in the interactive setting.

The notes and tape recordings of the naturalistic and simulated planning activities were analyzed in a manner similar to that used with the field notes. Because of the difficulty of transcribing the audio tapes, they were analyzed by repeatedly listening to the decision protocols and summarizing their content, making special note of decision components and processes. The variety and complexity of the different planning situations precluded an analysis of the protocols at a level similar to those used in previous process tracing analyses, but a model of the planning process was constructed that reflected the process at a more meaningful level. (This point will be discussed in more detail in Chapter IX.)

The data analysis and model development proceeded by alternation between data collection and conceptualization. The general procedure followed the steps in qualitative analysis initially advocated by Becker (1958) and used by Smith and Geoffrey (1968). They include:

1. Selection and definition of problems, concepts, and indices.

2. Checking the frequency and distribution of phenomena.

3. Construction of social system models.

4. Final analysis and presentation of results (Smith and Geoffrey, 1968, p. 14).

Time became an important tool in the analysis. Concepts, methods, and processes gradually surfaced in the data as a result of spending extended amounts of time observing and describing the teacher's decision behavior. As process elements became apparent, they were formulated into working hypotheses to be examined in future situations as well as in previous field notes. As models were further developed, they were discussed with colleagues at the Institute, many of whom were or had been classroom teachers. Thus, over time, concepts were defined and tested against classroom observations and a process model of teacher planning gradually took form.

Chapter Summary

The primary purpose of this study was to investigate teacher planning by a detailed examination and description of the decision process involved in one elementary teacher's planning decisions during a five month period of instruction. Data were collected by observation and recording of the teacher's activities in both the preactive and interactive phases of teaching and by recording the teacher's thinking aloud during planning in naturalistic situations in a new simulation task called the Teacher Planning Shell and in three judgment tasks. Data were analyzed by examining field notes and taped protocols as the study proceeded, and by generating and testing concepts and hypotheses

through interaction with previous data and ongoing teacher behavior. As a result, descriptions of the teacher's planning were developed along with models of the planning process. These descriptions and models will be elaborated and discussed in the following chapters.

CHAPTER IV

THE SETTING

The purpose of this chapter is to describe the character of the setting in which this study was conducted. The analogy that will be used is that of a play. Ecological psychologists have drawn on this analogy when they talk about behavior settings and props. The picture of the teaching environment that will be painted here will necessarily lack the richness and detail of the real setting, but like the oversimplified and often stylized stage backdrop, it will contain enough of the features of the real setting to convey the proper context. And, as such, it may serve to enhance the visual appreciation of the setting, and to facilitate the audience's perception and understanding of the action.

The chapter will follow a dramaturgical or theatrical outline. It begins by describing the stage and set on which teaching occurs. Next the characters and the major props in the classroom are discussed. Subsequent to that, a typical plot is unfolded followed by a more general discussion of the daily drama in the classroom. The final section discusses the set and props for planning.

The Stage: Byron School

Byron School[5] is located in a medium sized community adjacent to a large midwestern university. It is one of nine elementary schools in a rather progressive school district. The surrounding neighborhood is primarily made up of single family dwellings along with some rental property. The neighborhood is mostly upper middle class and many of its inhabitants are faculty, staff, or students at the university. Because of these university affiliations, the neighborhood is approximately 92% white with 8% minority inhabitants.

There is a very active and influential community organization in the area that is concerned with any city policy that would affect the neighborhood. Recently, they have been involved in issues such as building and zoning codes, parking and traffic control, and rental housing standards. The school also has a very active Parent Teacher Organization that sponsors work days several times a year to clear up the school grounds and activities like flea markets to raise money for the school. Community participation is very prominent in the life of the school, and there are always many more volunteers than needed for parent aides or room mothers.

Byron School was built in 1922 and is the second oldest building in the district. The building and playground take up a square city block, bounded on the south and west sides by primarily student rental housing and on the north and east sides by single family dwellings. The building is a three story, brick structure with a newer wing (built in 1946) that contains the lower grade classrooms. There are

---

[5]The names of the school, teacher, and students have all been changed to insure anonymity.

twelve classrooms in the building, eight of which are currently being used for general instruction. The other four classrooms function as a music room, art room, reading lab, and science room. The school also contains, in the older part of the building, a library and a gymnasium that also serves as an auditorium. The kindergarten, first grade, first-second grade, and second-third grade classrooms are on the first floor in the newer wing of the building. The third grade, fourth grade, and the two fourth-fifth grade classrooms are on the second and third floors of the building. A floor plan of the building is presented in Figure 4.1. The building uses steam heating that keeps the newer wing much too hot and the second and third floors much too cold throughout the winter. The older classrooms are characterized by very high ceilings and room for litte more than the teacher's and students' desks. The rooms in the newer wing are much larger than the older classrooms. In this wing there are two rooms on each side of the hall connected by a workroom containing restrooms, the teachers' desks, and storage space.

The Set and Props for Learning: Mrs. Lisa's Classroom

Mrs. Lisa's classroom is located on the north side of the new wing and adjoins the second-third grade classroom. This was the third year that Mrs. Lisa has had her first-second grade class in this room. Her three previous years were spent teaching special education in what is now the music room. (The special education classroom has been moved to another school in the district.)

The classroom is approximately twenty feet wide and thirty-five feet long. The north wall is made up of windows affording a view of

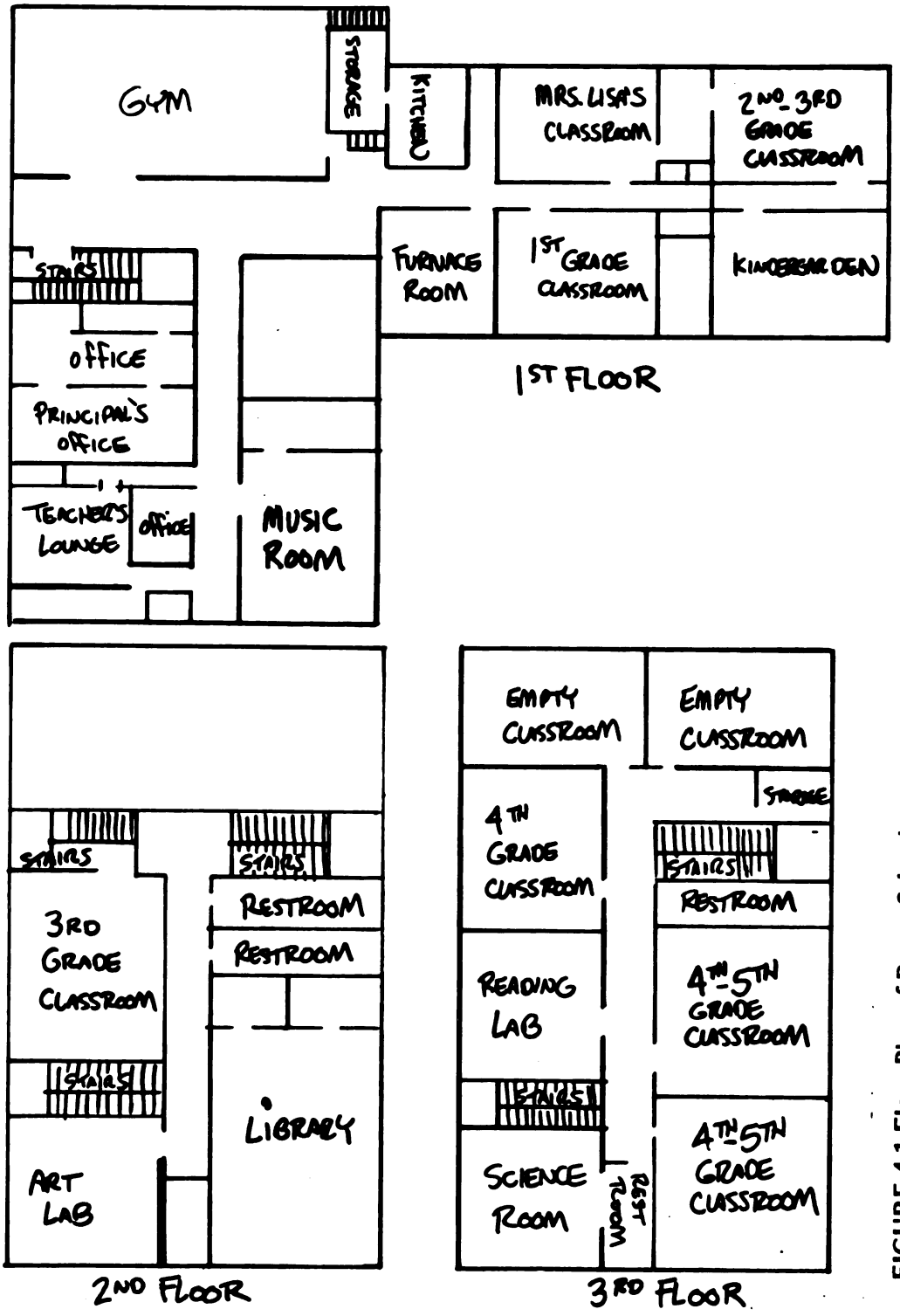


FIGURE 4.1 Floor Plan of Byron School

the asphalt play area just outside and the playground beyond. The floor is covered with a grey tile and the walls are light blue. Walking into the room, one is struck by the brightness and neatness of the room. Along the south wall there are brightly decorated bulletin boards on the doors of the built-in storage cupboards. Other bulletin boards around the room are covered with bright paper and are either decorated or used for such things as displaying today's weather and date, indicating job assignments, and displaying newspaper articles of interest. There are many posters and signs above the windows and around the room. The student desks, work tables, and bookcases are neatly arranged, and one gets the impression that everything is in its place.

The student desks are located toward the front of the room and the large chalkboard. The students sit in pairs at small tables that are rearranged several times a term. They are often grouped into three or four major seating clusters. On top of each table are rectangular plastic wash tubs (one per student) containing paraphernalia such as pencils, erasers, and rulers. Texts and workbooks are kept in a vertical file rack where each pupil's books are displayed in the slot behind his or her name.

There is a large (9 x 12 feet) rug toward the back of the room that is used as a gathering place for the whole class at the beginning of the day, after recess, and at other times when the whole group gets together. Near the rug, there is a small carpeted platform raised a foot off the floor that Mrs. Lisa sits on to direct activities. Around the edge of the rug are a half dozen brightly painted cement blocks that the students can use as seats. In addition, the room contains

two tables that are used with small groups, Mrs. Lisa's worktable which serves as her desk during the day, and several other worktables and cupboards. See Figure 4.2 for a basic floor plan of the classroom.

The "backroom" that connects Mrs. Lisa's classroom with the classroom next door is approximately eighteen feet long and twelve feet wide. In the middle of the room are Mrs. Lisa's and the other teacher's desks and file cabinets. Along the south wall there are two rest rooms (one for each classroom) and a storage closet. Windows run the length of the north wall and beneath the windows and along the west wall are storage cabinets with a low counter top on them. This area is used as an art lab where Mrs. Lisa sets out various materials that the students may use during their "choice time" activities.

Each year, Mrs. Lisa decorates the room and names activities following a central theme. This year the room is set up around a "Peanuts" cartoon theme, and there are many posters and signs around the room depicting various characters from this popular comic strip. Last year the room had a bicentennial theme, and the year before the theme was signs of the zodiac.

The room is very well furnished with enough room for an informal meeting area, four places where small groups can meet, chalkboards for each small group area, adequate storage space, a record and cassette tape player, and easy accessibility to film strip and movie projectors. The main inconveniences of this classroom are the noise from the adjacent playground, the small number of electrical outlets in the room, and the heat problem in the winter. The heat problem seemed to be the most troublesome. Since the new wing has radiant floor heating, it caused the floor tile adhesive to bubble up between the tiles, often

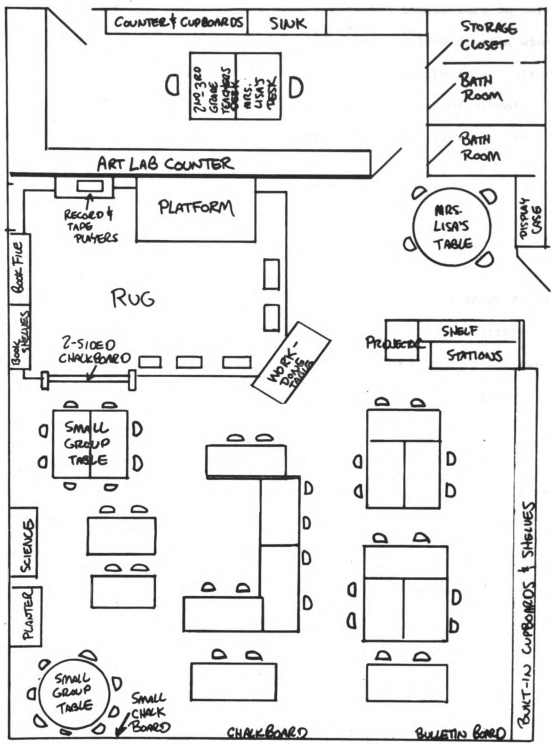


FIGURE 4.2 Mrs. Lisa's Classroom

making the floor too messy for sitting. Also, since all the heat for the wing went through Mrs. Lisa's room first, the temperature in her room often was as high as eighty degrees. This required opening windows and having the students wear lighter clothes in the room. After much complaining, several letters to the superintendent of schools, and several months of inconvenience, this problem was finally corrected.

The Main Characters: the Teacher and Students

The Teacher

When one first meets Mrs. Lisa, one gets the impression of an organized, energetic person. She is in her early thirties, a little over five feet tall, and has short blond hair. She makes most of her own clothes, and at school slacks or a jumper accompanied by brightly colored tennis shoes were her usual outfit.

Mrs. Lisa has been teaching for six years. Prior to teaching, she worked as a school social worker then returned to school and earned a Master's in special education. Her first three years of teaching were spent in a special education room in Bryon School working with emotionally impaired and learning disabled students. This was the third year that she has been teaching in a regular classroom, all of which have been first-second grade classes in Byron School. Mrs. Lisa is well respected by other teachers who call upon her for advice in handling difficult students and who are constantly amazed at the pace that she keeps up in her planning and teaching. Mrs. Lisa has described herself as a compulsive organizer and planner which is reflected in the amount of time that she spends preparing for teaching.

Mrs. Lisa designs many of the games and activities that she uses in the classroom. Much time is spent creating new materials to use with the students, and she is constantly on the lookout for new ideas that might be useful in her teaching.

Mrs. Lisa is married with no children, and she and her husband Bill live across town in a large townhouse complex. In her spare time she enjoys sewing and swimming, and she says that she has a passion for traveling that is too often left unfulfilled.

The Students

Because of declining enrollment in the district in the last few years, many teachers have been assigned combined or split classes. This is the third year that Mrs. Lisa has taught in a first-second grade split classroom in Byron School. The students that Mrs. Lisa had this year were assigned or selected mainly on the basis of teacher recommendations and parent requests. The kindergarten and first grade teachers recommended students that they thought would get along well both socially and academically in a split classroom. Some students who had created problems together were purposely split up. This also involved recommending the assignment of several fast first graders and several slow second graders to the room. Eight of the thirteen second graders had been first graders in Mrs. Lisa's room last year, and they and their parents requested that they return to the room. Several parents of first graders also requested Mrs. Lisa's room since the other first grade teacher was not assigned until late in the summer. The rest of the students ended up in Mrs. Lisa's classroom as a result of the need to assign specific numbers of students to each room.

For most of this study, there were twenty-seven students in Mrs. Lisa's classroom--fourteen first graders and thirteen second graders. This fluctuated throughout the year, however, and the slightly different composition of the class as the year progressed is listed in Table 4.1.

When asked to describe her class as a whole, Mrs. Lisa gave the following response:

> The group as a whole is on the immature side, dependent on me for many easy decisions they could make. (They) cry easily, (are) unable to create things on their own (in art or letter writing), (and) they tend, as a whole, to copy or imitate my work. They are louder than other groups I have had (and) are very talkative. On the whole, in comparing them to other (city) children, they are of average brightness with a couple of outstanding exceptions. They are difficult to manage as a class, as they tend to be very "I-me" oriented--not a sharing, work-together type group. They tend to take things for granted--are less appreciative. We have spent a lot of time on manners, cooperativeness, and consideration.

There was a wide range of ability among the students. At one extreme, a group of students was reading at a pre-primer level, and at the other extreme, a group was reading at a fourth and fifth grade level. In math the students ranged from a first to a fourth grade ability level. In most subject matter areas, the achievement of approximately half of the class was clustered just above grade level with the other half distributed somewhere above or below.

A richer view of the class can be presented by listing some of Mrs. Lisa's descriptions of individual students. When asked to describe several "good" or successful students in her class, Mrs. Lisa offered the following descriptions:

> Lana - hard worker, neat, consistent behavior, follows rules, very independent, sincere, very straight, far above grade level in academics.

Table 4.1

Number of students in Mrs. Lisa's classroom during the year

	First Grade		Second Grade		Total
	Boys	Girls	Boys	Girls	
September	6	9	7	5	27
January	5	9	8	5	27
March	5	9	9	5	28
May	5	8	8	5	26

Jim - sincere, sympathetic, good worker, follows rules, independent, well liked by classmates, responsible, tolerant.

Allan - independent, good sense of humor, kind to others, good worker, bright.

Elaine - well liked, athletic, independent, hard and neat worker, very responsible, follows rules, sympathetic to others, cooperative.

Bobby - popular, excellent judgment, good, neat worker, very independent, empathetic towards peers, cooperative.

Susan - independent, cooperative, considerate, good worker, bright.

Tommy - good worker; a bit immature, yet responsible; very, very bright; creative.

The following descriptions are of those students who gave her the most difficulty in the classroom--her "problem" students:

Tim - very insecure, unhappy, non-accepted, stubborn, responds negatively to many things, has many small annoying habits, tends to steal.

Billy - pushy, unkind, grabby, mean to other children, constantly talks.

Jan - very immature, very dependent, unable to make a decision, cries easily, bright.

Diane - emotional problems causing learning problems, immature, insecure, emotional block to listening.

Roy - severe learning problems, tries hard, reversals, poor reader, repeating first grade.

Anna - severe learning problem, immature, highly distracted, talks a lot, repeating first grade.

The Script: the Curriculum

The city school district influences the classroom curriculum in two major ways. It exercises a major influence by specifying performance objectives for all elementary grade levels in five subject

matter areas: reading, mathematics, writing skills, social studies, and science. These objectives were developed over a five year period with the cooperation of a group of classroom teachers, and are published in a handbook that is organized by subject matter topics. General objectives are provided for each area as well as enabling objectives for each grade level to work towards meeting the general objectives. Both affective and cognitive performance objectives are specified and examples are provided for each objective. The objectives are not presented as mastery objectives; rather, the emphasis is placed on specifying the grade level at which acquisition should begin. In the preface to the handbook, the following statement about its use is made:

> It (the handbook) has been developed by teachers with teachers as its key targets. As such, it is hoped that objectives are in a form that will be most helpful to teachers in (1) providing an overall picture of a subject area in total and by grade level, (2) establishing their own classroom and student objectives, and (3) sharing objectives with parents.

An outline of the objectives by subject matter is presented in Appendix C.

The objectives exercise an additional influence through the format of the student evaluation and reporting forms. At each grade level, performance statements based on enabling objectives are listed for reading, communication skills, math, science, and social studies. The teacher is to report the student's progress by marking for each statement whether the student is (1) doing well, (2) needs to improve, (3) is working in an area, or (4) whether the statement does not apply. The performance statements listed in the first and second grade evaluation and reporting forms are presented in Appendix C.

The second major influence the district exercises on the curriculum is through curriculum programs that have been adopted district-wide. The district has adopted programs in two subject matter areas. The Science Curriculum Improvement Study (SCIS) program has been chosen for elementary science instruction and the Man A Course of Study (MACOS)--Family of Man program--is being used for social studies. The complete SCIS kits are available in each school, and the Family of Man kits circulate among the schools. Within the last year, the district has also developed and adopted a standardized spelling check list for grades one to five. This check list is to become part of each student's permanent file, and at the end of the year, the teacher is to check those words that the student is able to spell.

In the classroom, Mrs. Lisa used all three of these programs with modifications. Since she is teaching a combined class, she has combined the first and second grade science objectives and selected activities from the Level 1 and Level 2 SCIS program to use with her children. She omits most of the beginning lessons in the Level 1 program since she feels the lessons are too repetitive. She mainly draws upon the second half of Level 1 and the first half of Level 2 so that there will be minimal repetition for those students who go into a second-third grade classroom next year. In addition to the SCIS materials, Mrs. Lisa also teaches additional units on such things as nutrition, dinosaurs, and the solar system.

For social studies, Mrs. Lisa uses three or four of the Family of Man kits during the year. This year she taught units on Mexico, Moscow, and Japan. In the fall, she began a unit on the states in the union, but discontinued it after several weeks because it was too

difficult for this class. Most of the social studies time in the fall is spent using a socio-emotional program called Developing Understanding of Self and Others (DUSO). The program contains records, posters, and puppets, and focuses on skills such as listening, cooperation, manners, and so forth. In addition to these programs, Mrs. Lisa has developed additional social studies units such as a unit on economics that she integrated with math. Mrs. Lisa uses the district spelling checklists, but has developed several lists of words that the students are taught prior to beginning the first grade words. At the beginning of the year, each child was tested on the spelling words and was assigned to each group depending on how far along he is in the list.

There is no reading series specified by either the district or the school. The school and district have available basal readers from several publishing companies. This year Mrs. Lisa has used three different basal reading series, upper level readers from three other series, and a phonics workbook series. She uses ditto masters for two of the series, and has developed comprehension worksheets for many of the texts.

In math, Mrs. Lisa uses the mathematics series adopted by all of the teachers in the building. She uses the workbooks for grades one through four and has developed a recording system for the workbooks to keep track of each student's progress during the year. She has also developed a series of math quizzes that are given several times a week. The quizzes are timed mastery quizzes designed to provide practice in addition and subtraction and move students towards meeting the computation objectives.

For handwriting a second grade workbook is used from a series that was adopted by several other teachers in the building. There is no language arts or writing skills program available to Mrs. Lisa, so most of this instruction is based on activities that she has designed. They include such things as board work, teacher-made dittos, writing to pencil pals, writing thank you notes and recipes, finding mistakes in written passages, and teacher-made games.

Special teachers are provided for gym, music, and art. The students leave the room for these activities, and Mrs. Lisa is not required to teach in these areas. The students spend one-half hour per week with the music teacher, one hour every other week with the art teacher, and thirty minutes three times per week with the gym teacher. They also spend an hour per week at the library and forty-five minutes per week with the reading consultant in the reading lab.

Activities that are not subsumed under the above subject matter areas include perceptual and psychomotor skill training, listening skill development, reading aloud to classmates, art projects in the room, and field trips. Several times during the year, the class plans and cooks a meal together in the room. Mrs. Lisa uses this activity to integrate math and writing and to give the students a realistic application exercise for these academic areas. This year she also had the students publish a class newspaper in order to integrate various aspects of language arts.

A Typical Plot: a Day at School

Before describing the more general characteristics of Mrs. Lisa's teaching and planning, it may be helpful to describe a typical school

day. It is difficult to isolate and describe a typical day in Mrs. Lisa's classroom since the scheduled activities vary widely from one day to another. The purpose here is not to describe what is typical of or common to all school days, but rather it is to provide a picture of one representative school day. The day that has been chosen is a Monday in February, the week before Valentine's day.

Mrs. Lisa arrives at 8:00 a.m. This morning she spends the time before school running off dittos and beginning her weekly letter to parents that she will send home on Friday.

The first bell rings at 8:55 and the students come in from outside. They go immediately to their lockers and begin removing their coats and boots. Mrs. Lisa is in the hall greeting the students and collecting the empty envelopes in which she sends the week's work home on Fridays. The students come into the room and most go over to sit on the rug. One of the students, Allan, has brought in his valentines and begins putting them in the students' mailboxes at the "post office." Several other students gather around him. Mrs. Lisa enters the room and tells them that they should be on the rug unless they are distributing valentines.

At 9:00 the second bell rings, and Mrs. Lisa comments to the class, now sitting on the rug, that they are not doing their jobs. She then asks who are the Today Is and Weather Report persons. Tim and Diane get up to do their jobs. Jan, who has also forgotten her job, gets up to mark off the day on the calendar. Mrs. Lisa begins calling the roll. The students respond to their names as they finish putting on their shoes. When Mrs. Lisa finishes the roll, she remarks that there are five people absent this morning. She then asks Tim and

Diane who are standing by the date and weather boards to give their reports. Tim does all right, but Diane has up the wrong month and day of the week. Mrs. Lisa corrects her mistake, then has her say the correct day and date. Mrs. Lisa then asks whose job it is to take the attendance slip to the office. Bobby jumps up, takes the slip, chooses one of his classmates to go with him, and leaves for the office.

Mrs. Lisa then asks the Snoopy Snews people to come up to the platform. Debbie comes up and Mrs. Lisa asks who the other Snews person is. Jim says that he is, but has forgotten to bring in a news article. Debbie shares a story about down filled clothing. Mrs. Lisa asks the students if anyone has an article of clothing containing down insulation. She then reads exerpts from the article to the students, explaing as she goes along. Several students then comment about down clothing that they have.

At 9:10, Mrs. Lisa finishes the discussion, thanks Debbie, and walks over to the small blackboard near the rug on which the morning schedule is written. The schedule has been written with mistakes in spelling, grammar, and punctuation; and Mrs. Lisa says, "OK, let's find the mistakes." Before she begins calling on the students, she points out this week's Break-the-Word Contest word that the students may try to unscramble before Thursday. She then begins calling on the students and correcting the mistakes that they point out. When done, she goes over the morning schedule with them. At 9:17, Mrs. Lisa picks up the handwriting folders and tells the students to come up and get them as she calls their names. The students get their folders and pencils and return to their seats.

At 9:20, Sandy, the aide, and Mrs. Pat, a parent volunteer, enter the room. Mrs. Lisa calls on one student from each of the seating areas to get the dictionary for his group. When done, she goes up to the front board and asks, "Who knows what the Mindbender is for this week?" A student says "consideration." Mrs. Lisa writes it on the board, and the students copy it onto their sheets. Mrs. Lisa then has the class find the word in the dictionary, read the definition, write down a short definition, then write a sentence using the word. Sandy and Mrs. Pat circulate around the room aiding those students who have questions or need help.

At 9:40, Mrs. Lisa hurries along several students who are not finished and tells the "Nowadays"[6] reading group to get their books and pencils and go to the back table (Mrs. Lisa's table) to read with Mrs. Pat. She calls the students in the low reading group by name and tells them to get their books and go up to the round table at the front of the room. The students in the "Highways" group (the top group) are instructed to go to the rug to read with Sandy. She then explains the assignment on the board to the remaining group ("Seven Is").

By 9:45, Mrs. Lisa is sitting down and reading with the pre-primer group. She has them turn to a specific page and begin reading. Each student reads aloud one page as he is called on. If a reader has difficulty with a word, Mrs. Lisa helps him or her sound out the word. Periodically, she comments on the pictures or on what is happening in the story.

---

[6]The reading groups are named after the title or part of the title of their current reading books.

At 9:57, the "Nowadays" group that has been reading with Mrs. Pat finishes reading. The students put away their books in the book file cabinet, get their reading folders, and return to the table. When the pre-primer group finishes their story, Mrs. Lisa has them open their phonics books. She tells them to put their names and date on the assigned pages, and tells them that today they are going to work on the short u sound. She then works through several pages with the group.

At 10:07, Mrs. Lisa looks up at the clock and tells the group that they page they are working on will be the last page that she will do with them. The "Highways" group has just broken up, and the students are working at their seats on dittos in their reading folders. The "Nowadays" group is still working with Mrs. Pat at Mrs. Lisa's table. Mrs. Lisa then tells the pre-primer group to put circles around the numbers on the next three pages and then explains how to work each page.

At 10:13, Mrs. Lisa announces, "It's recess time," and tells the class that they can leave their materials where they are working. She tells them that she has recess duty this morning and that they may head outside as soon as they are ready. By 10:16, Mrs. Lisa is hurrying along those students still in the hall and goes out for recess duty.

At 10:25, Mrs. Lisa blows her whistle, and the students come in from recess. She helps several students with their coats and boots in the hall. The students come into the room and go over to sit down on the rug, talking and putting on their tennis shoes. Mrs. Lisa enters the room after several minutes and tells those still putting on their shoes to hurry since they must leave for gym. She asks if anyone has seen Mike's other mitten. No one responds.

At 10:30, Mrs. Lisa again tells them to be sure to have their gym shoes on and tells the class that when they come back from gym, they can finish their phonics or folder work and then do their station work. She then calls the Line Leader who jumps up and heads out of the room and the Tapper who excuses each student by tapping him or her on the head.

The following excerpts from field notes describe Mrs. Lisa's activities while the students are at gym:

> Mrs. Lisa says that she's going to ask in several other rooms if they've found a mitten. She then goes down to the office to see why so many kids were absent today. When she returns to the room, Mrs. Lisa pulls out the folder work for those who were absent. She puts their names on the folders and then the word "absent" on top of each. She says she sends them home with their work done on Friday and puts notes at the bottom of the weekly letter to their parents. She isn't that concerned that they do it. She won't take the time in class for make-up, but she says many parents are real good about it and have their kids do it at home and bring it back to school. She next grades the other work turned in this morning. Mrs. Lisa writes down the pre-primer group reading pages for this week. She mentions that she tries to have them read four stories per session, and it goes down to three as the stories get longer since she wants to be able to spend more time on comprehension. She plans for Wednesday, Thursday, and next Monday in a notebook that she keeps with the reading materials for the pre-primer group. She looks at the next primer in the series. She then looks through the "Nowadays" reading books to see what work to put in their comprehension folders for next Monday. She checks to see if she has a worksheet for a story several pages away. She does, and says that this will work out just right since there are two days' reading before it.

At 11:05, the students return from gym. Mrs. Lisa tells them to get a drink, then start in on their work. She tells the "Seven Is" group to get their books and meet her at the round table. She gets her book and walks over, sits down with the group, and starts them on their story. Several times during the reading, students come up to

Mrs. Lisa with questions about their seat work. She lets them wait until there is a break in the reading, then quickly answers their questions.

At 11:20, Mrs. Lisa finishes with the reading group and tells the students to put their books away. She stands up and says to the class, "Anyone who has a question, put your hand up and I'll come and answer it." Mrs. Lisa spends several minutes answering questions and circulating to inspect the work that the students are doing at their seats. As the students finish their seat work and begin on their station work, the following incident is recorded:

> 11:25 Several kids are complaining that Karen is copying and telling the others the answers to the station work. Mrs. Lisa tells Karen that if that's what she wants to do, she'd rather have her throw it away than do the work.

Mrs. Lisa then puts up on the windows several ditto sheets that the students have colored, then continues pulling the morning work from the students' work-done folders. She comes to an empty folder and asks Debbie if she has completed her boardwork. Debbie says "no," and Mrs. Lisa tells her that it has to be done before she goes to lunch.

By 11:30, most of the students are on "choice time" although several are still working on their folders or on station work. Mrs. Lisa continues checking the students' work until 11:35 when she tells the class to begin cleaning up for lunch. She asks the "boardbuffers" to erase the front board. Several students come up to tell her that their station work is not done. Mrs. Lisa replies, "No sweat, you can do it this afternoon." She then walks over and writes the afternoon schedule on the small blackboard as the students finish cleaning up and stand behind their seats. When everyone is at his or her seat,

Mrs. Lisa calls the Line Leader and Tapper, and the students go out to their lockers. When they have gotten their coats or lunches (some stay for lunch and some go home), the students return to the room and go over to the rug.

At 11:40, the bell rings and Mrs. Lisa calls the Line Leader and Tapper. As the students are tapped, they leave for lunch. Before leaving for lunch, Mrs. Lisa spends approximately forty minutes finishing grading the morning's work.

> Mrs. Lisa pulls work out of the file folders and sees that Jim has turned in no work. She checks and finds his phonics book still in the book file cabined. She puts it on his desk and then walks over to the small blackboard and writes, "Jim W. - no recess." She then can't find Tom and Tim's phonics books. She marks them down on the point record sheet and marks "re-do" on sloppy sentences from the pre-primer group's board work. As she pulls the work from the "Nowadays" comprehension folder, she writes in next week's assignment on the attached assignment sheet. She then checks the pre-primer group's phonics books and marks how each student did on the record sheet attached to the inside of the cover. She then grades this morning's work in the B phonics book and the C phonics book.

Mrs. Lisa leaves at 12:20 to eat her lunch in the teachers' lounge and returns to the room at 12:50.

At 12:55, the first bell rings. Mrs. Lisa stands at the door of the classroom and watches the students in the hall. The students come in and sit on the rug; some put valentines into the mail boxes. At 1:00, Mrs. Lisa comes into the room, tells those delivering valentines to stop now, and then sits on the platform and calls the roll. When done, Alice and Tristin take the attendance slip to the office. Mrs. Lisa then goes over the afternoon schedule with the class, and then tells them that they will need pencils for the math quiz and that they can return to their seats. She passes out a quiz sheet to each

student, telling them to keep it face down. She then goes to the front of the room and explains to the class that they will have one minute to do as many problems as they can. She gets the class ready, then has them begin. After a minute, she calls time, and then has the students exchange papers. She reads off the answers, lets the students see how they did, then has the afternoon helpers collect the papers. Mrs. Lisa then reads a letter to the class from a previous classmate who is now living in Germany. She then puts the letter up on the Snoopy Snews Board so that the students may later look at the writing and the German stamps.

At 1:15, Mrs. Lisa begins a lesson on metric measurement. Excerpts from the field notes describe the activity:

> 1:15 Mrs. Lisa asks the students to get out their math rulers and asks Eric and Lucille to pass out a worksheet to everyone. She tells everyone that he or she should have two different sheets. She reminds them to put their names on them and then walks around making sure everyone has both sheets ...she asks the kids to make sure that they have a front and a back on each sheet.
>
> 1:20 Mrs. Lisa tells the kids to take out their rulers before they start, and for each to measure a hair on the person next to him or her. She then asks the kids how long their hairs were. Then she has the kids measure their hands from the palm to the tip of the middle finger. She circulates to check on them. She then asks for the different lengths that they've found and tallies the numbers on the front board.
>
> 1:25 When through tallying, she asks which number had the most tallies and which had the least...she then gives instructions for the next worksheet (on measuring objects) and circulates to check on who is measuring properly and who isn't. Mrs. Lisa pulls a few shades because of the sun's reflecting off the snow outside.
>
> 1:30 Mrs. Lisa goes back to the front and tells them how to do the other worksheet. She then checks

the work of several kids and tells the class that when they're done, they can turn the sheet over and begin on the other side.

1:35 Mrs. Lisa draws an object on the board and demonstrates how to measure an object that isn't straight, and how to add up the sides to get the length. She tells the kids that when done, they should put both sheets together, and asks Eric, Tom and Michelle to pick up the sheets as the kids finish.

At 1:40, Mrs. Lisa tells Bill and Eddy, who are far ahead of the other students, to get their workbooks and start working where they left off. She then calls students who have just completed a unit and passes out the unit test for them to complete at their seats. Next she calls by name the seven students who are in her lowest math group and tells them to get their notebooks and sit on the rug. Mrs. Lisa sits down with them on the rug and passes out a pretest for the next unit that they will be doing. She explains the sheet to them, works a few problems with them, and tells them that they may return to their seats and work on the pretest.

At 1:50, Mrs. Lisa calls those students in the top math group over to the rug. Before beginning with them, she says to the class, "Anyone with a question, now is the time." Two students come up, and she answers their questions. Mrs. Lisa then begins working with the group.

Mrs. Lisa hands out slips of paper to those on the rug and tells them she wants to start on the concept of carrying. She writes a problem on her sheet and tells them to copy it onto theirs. She gives them the problem 238 + 111. She stops Bobby who is starting to add the numbers with the hundreds column. She tells them that they should always, always, always start with the ones column; "otherwise, you'll get all your carrying problems wrong."

1:55 Mrs. Lisa gives them another addition problem with carrying to try. Mrs. Lisa calls Diane over and

tells her that all the work is wrong that she's just handed in to her. She explains what she's to do and tells her to re-do the problems. Mrs. Lisa then gives the group two problems, one that involves carrying and one that doesn't. She asks the group if they can tell the difference. She then explains that they can't leave a two-digit number in the ones' column. It has to be carried over to the tens' column.

2:00 Art comes up to the rug with a question. Mrs. Lisa gives the group two more problems and has them figure out which one needs carrying. She then answers Art's question. She then shows the group how to do a carrying problem and tells them to try one on their own. When they've tried, she works it with them. Fred brings up his work; Mrs. Lisa says it's okay and that he can do something on his own. Fred gets out the Blockhead game and begins playing with it. Mrs. Lisa works through another carrying problem with the group.

2:05 After a few minutes, Mrs. Lisa tells the group that they'll continue working on this later this week, but it's now time for recess.

Mrs. Lisa tells the whole class that it's time to clean up for recess. She calls Jim, Debbie, Art, and Mike over to the round table. She tells Jim that he has to complete the work he didn't do this morning and hands back to the others some work from this morning that has to be re-done.

At 2:10, Mrs. Lisa calls the Line Leader and the Tapper, and the rest of the class leaves for recess. She returns to her table and begins stapling together the metric work sheets done earlier. After about five minutes, Art and Mike finish their sheets and give them to Mrs. Lisa. She says, "That's better," and the boys leave for recess. Mrs. Lisa spends the rest of the recess looking over the math quizzes.

At 2:25, the students begin coming in from recess. Debbie gives Mrs. Lisa her re-done work, and Mrs. Lisa says that she has done a much better job. The students sit down on the rug. Mrs. Lisa then

passes out the spelling folders and reminds the class that they should each have a sheet of paper, a pencil, and their folders when they go to their seats. When everyone is seated, Mrs. Lisa goes to the front of the room and reads this week's spelling words for each of the five spelling groups. The words have been previously marked on the spelling lists that are stapled to the inside of their folders. The students follow along as the words are read for their group. When she is done, she goes over the headings they should have on their sheets of paper, and then tells everyone to write all of their spelling words once and to write two sentences using two of the words. As the students work, Mrs. Lisa moves around the room answering questions and checking their work. She picks up the folders as the students finish. Those who are finished sit and talk to those seated around them.

At 2:45, Mrs. Lisa puts away all of the spelling folders and walks over to a table near the window that has a box of science materials on it. She tells the students that they are to come up to the table and get a tray of science materials, and they are to work with partners until 3:00 trying to invent a "system" using the pulleys, rubber bands, and other materials on the tray. (This is a lesson from the SCIS unit on systems.) When all the materials are distributed, Mrs. Lisa walks around the room making comments on the students' efforts. The students are working intently on their systems, talking and showing to others what they have created.

At 3:00, Mrs. Lisa tells each pair to decide on one system and put it together so they can demonstrate it to the class. She also tells them to think of names for their systems while they are waiting

for everyone to get ready. The remainder of the lesson proceeds as follows:

3:05 The students start demonstrating their systems at the front of the room. Mrs. Lisa writes the names of the systems on the front board. Some of the names they tell her are: the putt-putt, the blast-off system, the typewriter noise system, the train system, tic-tac-toe, the fan, the cuckoo system, and the break system. She tells those not demonstrating to be quiet and not to play with their systems. She warns Paul once and then takes his tray away from him.

3:15 Mrs. Lisa tells the class that the other person in each pair should now make a system. She also tells them to begin to fill out the sheets that she gave them earlier. Each student is going to put the name of the system and the objects of interaction on it. She lists the possible objects on the board that they may have used.

3:20 Tom says that he feels as if he's going to be sick. Mrs. Lisa asks him if he can wait until school is out, and he says no. She then sends him down to the office to call his mother. Mrs. Lisa then tells the class to draw their first system at the bottom of the sheet. She draws an example on the board and circulates to check on how they're doing. She then tells them that if they can't remember, to put the system back together again and then draw it.

3:25 Mrs. Lisa tells the kids to listen closely to the instructions so they can start where they leave off next time. She tells them to put their initials on the bottom of the tray that their materials came on and to circle the initials of the person who is supposed to demonstrate next time. They are to take the systems apart; otherwise, she won't accept them. She goes around the room and picks up the system description sheets from those who are finished.

3:30 She tells those who are ready to bring their trays up to her.

When the systems are turned in, the students put their chairs up on their desks and begin cleaning up the room. Those who do not have a clean up job stand by their desks. Mrs. Lisa reminds the class that

there are two times that they may pass out valentines: five minutes before school starts and during choice time.

At 3:35, Mrs. Lisa tells the class to get behind their seats if they are ready. She inspects the room and thanks the class for being quiet today. She reminds the students to check the "nameless bucket" (where nameless papers go) before leaving, and then calls the Line Leader and the Tapper. The students file out to the hall to get their coats and boots on. When they are dressed, the students come back to the rug and wait for the bell to ring.

At 3:41, the bell rings. Mrs. Lisa calls the Line Leader and the Tapper, and the students leave for home.

After school, Mrs. Lisa sits down at her table and writes the reading assignments into the "Highways" group folders for Wednesday. She then looks over the math quiz from this afternoon and separates the perfect papers from the rest. When done, she gets out the handwriting workbook and plans the handwriting lessons for the rest of the week. After that, she checks the math work from this afternoon. At 4:40, the teacher with whom she rides home comes into the room, and she packs up to go home for the day.

The Drama: Life in the Classroom

Mrs. Lisa has described her teaching style as traditional, organized, structured, flexible, routine, consistent, creative, and demanding. These adjectives well portray the organization of her teaching, and may serve as an outline for describing life in her classroom.

Classroom Organization

Mrs. Lisa's classroom is traditional in the sense that she is in charge at all times. She does all of the planning for and organization of instructional activities, thus providing a well structured learning environment for the students. She requires that for most activities, noise be kept at a minimum, that the students be polite and respectful to her as the teacher, and that they be courteous and well behaved towards each other.

All activities are planned and organized well in advance of teaching. Materials are checked and rechecked before class; and instructions for activities, the passing out of materials, and the activities themselves run smoothly once initiated. Much of Mrs. Lisa's work before school and during breaks involves preparing and organizing materials for activities later in the day. Once an activity begins, little or no time is needed to locate and organize materials for the students.

At the beginning of fall term, and prior to the beginning of winter and spring terms,[7] Mrs. Lisa draws up a weekly schedule for the class. This schedule is tentative at first and may be modified somewhat before its establishment by the third week of the term.

Mrs. Lisa establishes a classroom schedule for several reasons. Primarily, she does so since she feels that children of this age need a schedule and routine to reduce anxiety. She feels that too much change is disorienting for the students and that they learn better if

---

[7]The "term" is not an official calendar designation, but is a division that Mrs. Lisa uses in her planning since winter and spring breaks divide the school year into three sections.

they can predict what is coming next in the day. She tries to be flexible in her teaching, but tries to avoid abrupt or frequent changes in routine. A weekly schedule also aids Mrs. Lisa in her planning so that she can count on a specific number of lessons with a fairly set duration. A schedule also makes it easier to schedule her teacher aide and parent volunteers on a regular basis.

The Weekly Schedule

The weekly schedule becomes the major time allocation mechanism in Mrs. Lisa's classroom, and each term the schedule is changed to reflect her instructional priorities. Most of the fall is spent getting to know the students, organizing the class socially, and sorting out the students by ability levels. Much student time is spent on listening to instructions, following directions, and on other basic classroom skills. The winter term is the heaviest academically, and much emphasis is placed on reading and mathematics. Spring term is slower paced, with a continued emphasis on reading and math skills, but with more time devoted to writing skills, social studies, and science. Throughout the year, Mrs. Lisa places a premium on developing basic reading and math skills, and, as a result, science and social studies are often given a less prominent position in her curriculum.

Mrs. Lisa strives to meet several criteria when establishing her schedule. She tries to balance each day between the more intense academic activities such as reading and math, and more active large group activities such as art, science, and social studies. She tries to schedule a more rigorous academic regimen for earlier in the week when the students are fresh, and taper it off on Thursday and Friday as the

weekend approaches. Mrs. Lisa also tries to schedule activities to take into account times when the students will be more active such as after gym and recess, and times like the end of the day when the students will be more fatigued. Her second major concern is to schedule small group and individual activities when she will have help in the classroom. There is a full time aide for the four classrooms in the newer wing of the building, so Mrs. Lisa must schedule her in advance on a regular basis. She uses her to help with reading groups three mornings a week, for math one morning, and to help give spelling tests to the spelling groups on Friday morning. She also has four parent volunteers, two of whom help with reading groups once a week, one who helps with math one morning a week, and one who serves as a reader during library. During most terms, there is a student aide who is in the classroom one full day per week.

Each day is divided by lunch and recesses into four instructional blocks, as shown in Figure 4.3. There is an hour and ten minutes from the beginning of school to the morning recess, an hour and fifteen minutes between recess and lunch, an hour and ten minutes between lunch and the afternoon recess, and an hour and fifteen minutes from recess to the end of the school day. Each recess is fifteen minutes long, and the lunch period lasts for an hour and fifteen minutes. School begins at 9:00 a.m. and is over at 3:40 p.m.

At the beginning of the year, times for music, art, library, reading lab, and gym are chosen on the basis of teacher seniority or assigned. Once these times are set, Mrs. Lisa is free to arrange her schedule as she desires. Once aide times are set, they are not very flexible because of the need to coordinate with other teachers, but

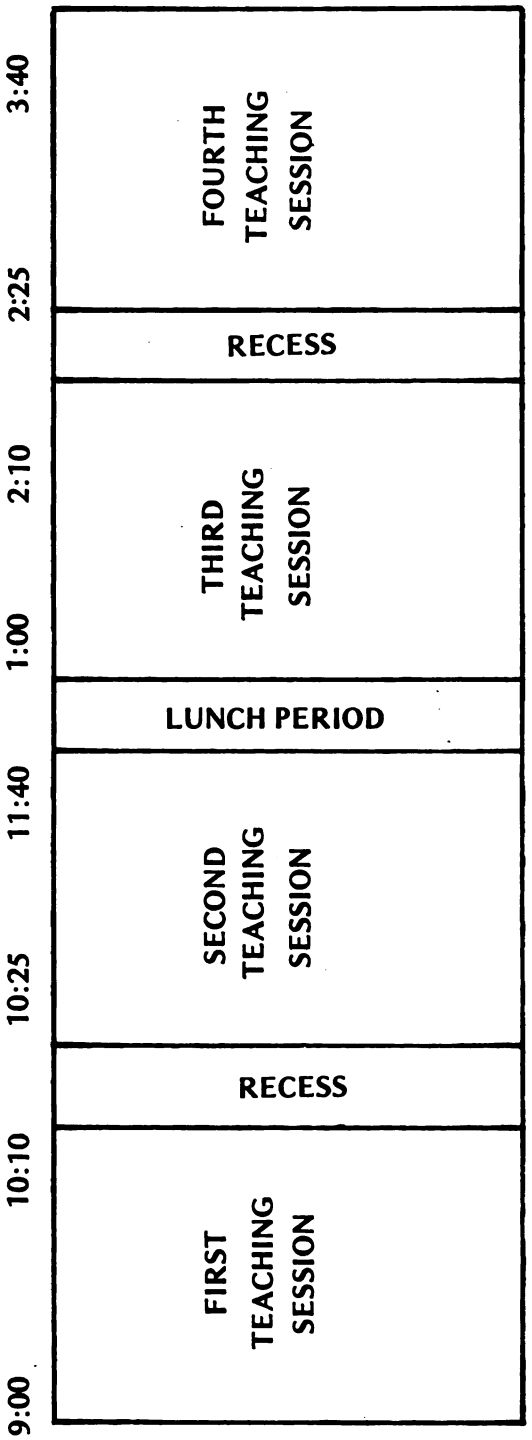


FIGURE 4.3 Divisions in the school day

parent volunteer times are more easily changed. Reading and math are for the most part scheduled for the morning when help is available, and large group activities such as science, writing skills, and social studies are typically scheduled for the afternoon. Mrs. Lisa's winter term and spring term weekly schedules are presented in Figures 4.4 and 4.5.

The daily schedule provides adequate time between activities to allow for transition as a group and to take into account individual differences in student work rates. Mrs. Lisa has developed two mechanisms to handle these differences. The first is station work. This year there were two stations in the classroom (there have been as many as five in previous years) to which students are variously assigned on Monday, Wednesday, and Friday. The station work consisted primarily of dittos that were oriented towards perceptual and psychomotor development in one station and more academically oriented in the other. When students finished their morning work on these days, they would determine their work station work assignments by their initials that Mrs. Lisa had placed in a slot over the station, and then complete the assignment. If this work was completed before the period ended, the student was generally free to sign up for the second controlling mechanism, choice time.

Choice time consists of free time activities that Mrs. Lisa has provided for the students. These activities include the art lab in the back room, games, a science center, the record player, construction blocks, books, and so forth. The number of students participating in each activity is regulated by a board with nails on which students may put tags with their initials. The choice time activities are used

Monday	Tuesday	Wednesday	Thursday	Friday
9:00 Roll Snoopy Snews Mindbender Reading Phonics Books and Boardwork	9:00 Roll Snoopy Snews Handwriting Reading Lab	9:00 Roll Snoopy Snews Handwriting Reading Reading Folders	9:00 Roll Snoopy Snews Handwriting Reading Writing Skills	9:00 Roll Snoopy Snews 9:10 Music 9:40 Snoopy Books Word Contest
RECESS	RECESS	RECESS	RECESS	RECESS
10:30 Gym 11:00 Finish up (Reading)	10:30 Story Math	10:30 Gym 11:00 Finish up (Reading)	Story Math	10:30 Gym 11:00 Spelling Tests
LUNCH	LUNCH	LUNCH	LUNCH	LUNCH
1:00 Roll Spelling Science	1:00 Roll Art/Writing Skills	1:00 Roll Decoding Math	1:00 Math Quiz Weekly Reader Writing Skills or Social Studies	1:00 Roll U.S.S.R. Social Studies
RECESS	RECESS	RECESS	RECESS	RECESS
2:30 Math	Science or Social Studies	2:30 Library Math Quiz	2:30 Pass out papers 3:00 Spelling Bee	2:30 Treat Clean up Change jobs Movies

FIGURE 4.4 Winter Term Schedule

Monday	Tuesday	Wednesday	Thursday	Friday
9:00 Roll Snoopy Snews Reading Book Reports	9:00 Roll Snoopy Snews Handwriting 9:20 Reading Lab	9:00 Roll Snoopy Snews Math Quiz Math	9:00 Roll Snoopy Snews Math Quiz Math	9:00 Roll Snoopy Snews 9:10 Music 9:40 Word Contest Handwriting
RECESS	RECESS	RECESS	RECESS	RECESS
10:30 Gym 11:00 Mindbender Finish up	10:30 Story 10:40 Math Quiz Math	10:30 Gym 11:00 Handwriting Finish up	10:30 Story 10:40 Reading Reading Workbooks or sheets	10:30 Gym 11:00 Spelling Tests
LUNCH	LUNCH	LUNCH	LUNCH	LUNCH
1:00 Roll Math Quiz Math	1:00 Roll Art/Writing Skills	1:00 Roll Reading Phonics Book	1:00 Roll Social Studies or Science	1:00 Roll U.S.S.R. 1:30 Social Studies or Science
RECESS	RECESS	RECESS	RECESS	RECESS
2:30 Read-A-Story 2:45 Social Studies 3:20 Spelling	2:30 Weekly Reader 2:50 Spelling	2:30 Library 3:15 Spelling	2:30 Read-A-Story 2:45 Pass out papers 3:10 Clean up 3:15 Spelling Bee	2:30 Read-A-Story Treat Clean up 3:00 Movies

FIGURE 4.5 Spring Term Schedule

to provide the students with a change of pace as well as to provide for learning and skill development in a more informal play situation.

Grouping for Instruction

Instruction in Mrs. Lisa's classroom is primarily conducted in large and small groups. Students who are having problems that require extra help are worked with individually, although time is rarely taken away from group instruction for this purpose. Individual help is most often given at times when the remainder of the class is doing work at their seats.

When Mrs. Lisa came from a special education classroom to the regular classroom, one of the beggest errors she remembers making was trying to individualize all of her teaching. She said it was easy for nine to twelve special education students, but it was a "disaster" for a split classroom of twenty-five to thirty students. Now, Mrs. Lisa tries to group students in those subjects where there will be wide variation in basic skills and where attention to individual differences is most crucial at this age. This normally includes subjects such as reading, mathematics, and spelling. Most writing skills activities were conducted as a large group (whole class) since they mostly involved skill development and practice, and she felt she could adequately monitor performance through turned-in assignments. Social studies and science were taught as a large group since grouping was not perceived as necessary, and planning for these subjects involved enough time and effort as it were.

This year, Mrs. Lisa also grouped the students for reading, mathematics, and spelling. Activities were never divided by grade level,

and Mrs. Lisa never referred to the students as first or second graders. Reading groups were established around the fourth week of fall term. Group membership changes were common in the fall as students improved, but became less frequent in winter and spring terms. There were four reading groups this year: a group of first graders reading at the pre-primer level, a group of second grade boys reading at the first grade level, a group of first and second graders reading at the second grade level, and a group reading at the third and fourth grade levels. Math groups, usually three in number, were set up for specific units based on pretesting. Within math groups, students often worked at different paces in their workbooks. Spelling groups, as mentioned earlier, were set up by pretesting the students on the district spelling list in the fall. Spelling activities were usually done in a large group, with each student using the words assigned to his or her group. Social studies, science, and writing skills were always taught to the whole class.

Instructional Goals

Many of Mrs. Lisa's goals for the year are concerned with developing responsibility, neatness, independence, and cooperativeness in the students. When academic assignments are made, she expects each student to complete his or her work in a neat manner and turn it in to the proper place. Each student has a "work-done" file near Mrs. Lisa's table, and worksheets and workbooks are to be turned in when completed. Responsibility is further fostered by the assignment of jobs in the classroom. Each week jobs are chosen by the students that include such things as Boardbuffer (board eraser), Light Person (responsible for

turning off and on lights), Stagehand (pulls down shades and projection screen for films), Helpers (help Mrs. Lisa pass out or collect materials), and Tapper (taps students on the head when they are quiet and ready to leave the room for recess, lunch, going to the library, and so forth). There are enough jobs so that everyone can have one each week. Besides developing responsibility, Mrs. Lisa has found that the jobs provide a mechanism for keeping the room neat and clean and activities running smoothly.

Mrs. Lisa's academic goals are much more loosely defined than her social objectives. She uses the district objectives as a general guideline for what should be presented, but does not formulate behavioral or other objectives for the students. She has expectations for the students, although she does not feel that every student should get to the same point by the end of the year. She tries to monitor closely each student's learning progress, especially in reading, math, and language arts, and then uses grouping and sometimes individual instruction to allow the students to progress as far and fast as they can. Mrs. Lisa spends most of her instruction on fundamentals in reading, writing, and math since she feels strongly that a solid foundation in these areas will be the basis for later progress.

Classroom Discipline

Disciplining was rarely observed in Mrs. Lisa's room. When it occurred, it was smooth and rapid and rarely interfered with class activities. Mrs. Lisa clearly specified appropriate student behavior in various situations. Contingencies for misbehavior were well laid out, and she was consistent in following through on her promises. She said

that this approach to discipline resulted from her special education experience and seemed to be very effective in the regular classroom.

Creativity in Teaching

The creative aspect of Mrs. Lisa's teaching was apparent in most all of her instructional activities. Potentially dull and routine tasks were usually framed in activities that resulted in a high level of student interest and involvement. Many activities and groups were named after Peanuts characters--a technique that heightened interest and involvement. Mrs. Lisa's creativity was apparent in her development of science and social studies activities, but was most obvious in language arts. A few examples might best illustrate this point.

Each Monday morning, the handwriting lesson consisted of spelling, looking up in a dictionary, and writing the "mindbender" word for the week. These were words such as vociferous, sympathetic, procrastination, and scrumptious that were used as vocabulary builders. They were tied into social studies later in the week when the students did their "Snoopy books." These were folders for which each week the students were given a ditto containing a Peanuts character engaged in an activity related to the mindbender word. For instance, the students were given a picture of Snoopy dressed as a detective ("Super-Sleuth") when the mindbender word was investigate. The students were asked to write the mindbender word on the sheet, and then Mrs. Lisa directed a short discussion about the meaning of the picture and the mindbender word with an emphasis on social and affective development. Another example of creativity was the decoding activity. Each student was given a sheet with a symbol code for each letter of the alphabet.

They were required to write all of their spelling words in code, and then to decode a message that Mrs. Lisa had written on the board. This provided a review of the spelling words as well as practice in handwriting.

Other activities were framed in semi-competitive situations that allowed the students to display their academic abilities. One of the favorites was the weekly Spelling Bee. An excerpt from the field notes illustrates how this activity was conducted.

2:53 Mrs. Lisa numbers off the kids by two's and tells them to sit down on the floor in two lines down the middle of the room. She then tells them the ground rules: "no drinks, no getting up for anything except for marking points on the board." She also reminds them of their promise made last week to be quiet if she continues with the spelling bees. She tells them she will stop immediately if they are noisy. She begins the spelling bee, calling kids from alternate rows, using words from each student's spelling list. (Note: She has to look at the student, remember what group he or she is in, and pick a word from the list that hasn't been used.) She pronounces the word and uses it in a sentence before asking for an answer. If the spelling is correct, the student gets up and marks a point for his or her team. If it is wrong, Mrs. Lisa skips to the next person.

3:05 They finish one round and start down the rows again. J. raises his hand and Mrs. Lisa calls on him. He says, "D. made two marks (on the board)." Mrs. Lisa tells him that she is keeping score on her paper, so she will know if he does. She comes to D. and tells him that she is going to ask him a word and if he misses it, she will give him another one. She asks him a word off of another spelling list (I assume more difficult). He spells the word correctly and, she says, "Good,"I'm going to move you to the other group."

3:10 She continues down the rows. T. and D. are talking. Mrs. Lisa sends them immediately back to their seats.

3:14 They finish the bee. Mrs. Lisa walks to the front board and counts the points.

Another competitive activity was the Word Contest. This involved the students' writing as many words as they could based on the letters in the mindbender word within a specified period of time. In the fall, the class tried to see how many words they could generate as a group, and by spring Mrs. Lisa was giving an award to the person who could generate the most words by him- or herself.

Communication with Parents

Mrs. Lisa feels strongly that it is important to communicate to the parents what is going on in her classroom. The primary way that she accomplishes this is by writing a letter to the parents that is sent home each Friday. In this letter, she comments on special activities that the students did during the week and notifies the parents of anything special that the students will be doing next week. She also uses the newsletter to remind the parents of special days such as professional development days when school is not in session all day, and of times when the students need to bring in money for field trips, book club orders, and so forth. Appendix D contains the first letter that Mrs. Lisa sent out in the fall and examples of letters sent home during winter and spring term.

Another way that Mrs. Lisa communicates with parents is through the take-home envelopes that she sends home on Fridays. This contains all of the work that the student did during the week. As Mrs. Lisa grades the students' work during the week, she puts it into a large tray. On Thursday afternoon, she sits down on the rug with the class and passes back the graded work. The students can then see how they did on each assignment and ask any questions that they have. Mrs. Lisa then has them pass in their work, and she puts it in their large

manilla envelopes. On Fridays, she puts her letter and the school newsletter in the envelopes and sends them home. At the beginning of the next week, the students are to bring back their envelopes with their parents' signatures and comments in the space provided on the outside of the envelope. This way she makes sure that the parents have an opportunity to see their children's work and respond with any questions or comments.

The school district requires only two grading reports and parent conferences each year. Mrs. Lisa feels that there is too much time between them, so she has developed a feedback form that she sends home in March. This provides the parents with more specific information about where their children are in reading, math, and writing skills than they receive by seeing their children's work or through the personal notes that Mrs. Lisa often writes on the bottom of her weekly letters.

To follow up comments or questions that parents have sent to her and to keep certain parents appraised of their children's special problems or unusual progress, Mrs. Iisa spends on the average of four hours a week on the phone talking with parents. This usually takes place at night or on weekends, and is a major portion of the school related work that she does at home. Mrs. Lisa spends so much time on this and other activities because she feels that the home is a major and crucial influence on her students. She believes that life at home directly affects both the academic and social performance of the students. Because of this, she tries to keep abreast of things that are happening at home in a student's life, and tries to let the parents know what is happening at school. She also feels that the parents can

play a more active role in their children's learning if they know what activities are going on at school, and if they can see samples of their children's work. In short, she sees the home and the classroom as extensions of each other and feels that the children's school experiences will be more meaningful if the teacher and the parents know what is going on in the other portion of the children's lives.

Summary of Classroom Life

To summarize, Mrs. Lisa's classroom is run in a fairly traditional manner centering around well planned, organized, and structured activities. Much effort is spent on developing responsibility, neatness, independence, and cooperativeness in her students. Daily and weekly activities are guided by a well structured schedule that has as its goal the provision of well balanced, interesting, and effective learning activities. Students are grouped for reading, math, and spelling, and aides are used to facilitate small group instruction. Many creative activities are used for teaching language arts and writing skills, and semi-competitive situations are used to create an enjoyable atmosphere for learning and for performance testing. Mrs. Lisa makes many efforts to communicate these activities to the parents of her students through a weekly letter, by sending work home on Fridays, and through phone conversations.

The Set and the Props for Planning

The previous sections have focused on those aspects of the setting most closely related to Mrs. Lisa's interactive teaching. This has been necessary to provide a comprehensive view of the environment in which this study of planning was conducted. Since this was a study of

planning, the setting in which Mrs. Lisa's preactive decision making occurs becomes of special interest. The purpose of this section is to provide a description of where, when, and with what Mrs. Lisa does her planning. The major description of the "how" of her planning will be reserved for later chapters.

Planning at School

The planning that Mrs. Lisa does at school is usually of a short term nature. This mainly includes weekly and daily planning. The district requires that each teacher keep a plan book with daily lessons filled in one week in advance. They are to keep these plan books on their desks so as to be available to substitutes if they have to be called on short notice. There are several principals in the district who require their teachers to submit their plans for the next week by Friday afternoon, but Mrs. Lisa has never had to do this since she has been at Byron School.

Mrs. Lisa lays out her weekly plans two weeks in advance and then makes any necessary modifications on a weekly or daily basis. The other teachers in the lower wing use the standard plan book in much the same way, although Mrs. Lisa's planning is usually in more detail and done farther in advance of teaching.

Mrs. Lisa does most of her in-school planning at her work table near the door. This is a low round table that serves as her base of operations during the day. On the table is a plastic filing bin in which she keeps a clip board with frequently used record or scoring sheets and several file folders and teacher manuals. Also on the table are a can of pencils and pens, a tape dispenser, and a stapler, plus a

stack or two of teacher manuals, workbooks, dittos to be used later in the day or week, and miscellaneous notes that Mrs. Lisa writes as reminders to herself. The round table is Mrs. Lisa's area and is only occasionally used by the students when they read in small groups. Mrs. Lisa uses this table rather than her desk in the backroom since it gives her more room to spread out whatever materials she is using. It also is easily accessible to the students' work-done folders and the filing rack where the students' books and her teacher manuals are kept. If her table is too cluttered, Mrs. Lisa may move to one of the other tables in the room where she has more room.

When doing her weekly and daily planning, Mrs. Lisa usually has present her plan book and the notebooks in which she has done her more long range planning. Often she will get up and check a text or workbook for page numbers or will look in her file cabinet for a worksheet that she might want.

There are basically three times during the day that planning may occur: in the morning before school, during breaks in the day, and after school. Mrs. Lisa says that she is not a "morning person," and as a result, does not function at her best early in the morning. Before she leaves school in the evening, Mrs. Lisa tries to make sure that there is nothing left undone that is essential to tomorrow's activities. Typical morning activities, because of this, usually involve such things as running off dittos that will be used in several days, writing her weekly letter, and running necessary errands such as checking the film schedule in the teachers' lounge, returning a book to the library, or talking with another teacher.

Mrs. Lisa has typically three breaks in the day, and sometimes four, when she can do some planning. These are the two recess periods and the lunch period, and the times when the students leave the room for gym, art, and music. Most of this time is taken up by marking the students' papers from the morning or afternoon, although occasionally, as time allows, Mrs. Lisa will do some weekly or daily planning then.

For some activities, her planning is entwined with her evaluation. If an activity is based in a folder, as are some spelling, handwriting, and reading activities, the folder usually includes an assignment and comment sheet attached to the inside cover. When Mrs. Lisa grades the work from today, she will also make next week's assignment and enclose the appropriate worksheets. In this manner, she does not have to deal again with the folders until she passes them out for the activity the next week. Several excerpts from the field notes illustrate this practice:

> As she pulls the work from the "Nowadays" comprehension folders, she writes in next week's assignment on the assignment sheet. (2/7)

> (As she begins grading the comprehension sheets) she remembers that the kids won't be here next Monday to do the folder work because of Presidents' day. She decides to do the folder work next Wednesday because she says that it's more important than phonics work at this point. She gets the "Nowadays" reading book and looks through it to see what story they will be reading this Wednesday so she can get the comprehension worksheet to go with the story. (2/14)

Mrs. Lisa does most of her daily planning after school. Since the schedule and the weekly planning usually already specified what activities will occur each day, most of this planning is intertwined with setting up activities, writing assignments on the board, and so forth. This is especially true for well routinized activities such as reading,

where the only major daily decision that she has to make is about content. This selection from the field notes shows a typical afternoon's work.

> After school, Mrs. Lisa asks the student aide to finish grading the other side of the pretest that she started on earlier. Mrs. Lisa then sets up the station work (for Friday) and then writes tomorrow's lessons. She remembers that she has a new aide coming tomorrow (Jenny's mom) and starts to assign her to the "Nowadays" group, but remembers that Jenny is in that group. She reassigns Sandy to this group and then goes up to the front board and writes the reading assignments for tomorrow. She then walks over to the small blackboard and writes the word "due" and underneath (1) word contest, (2) library book, (3) homework. She sets up the memory blocks and pulls the spelling work from the spelling folders. She gets the math board work out of the work-done folders and sorts it by groups. She then looks through the metric pretest and begins planning the next steps that she's going to take with the unit. She then grades today's spelling lessons. (2/2)

Planning at Home

Most of Mrs. Lisa's long term planning is done at home. The primary reason for this is that at home, there is much more room to spread out the materials and she can leave them out until she is finished. At school, things must be put away to make room for daily activities. Also, home is a more comfortable atmosphere for long periods of planning.

Mrs. Lisa does her planning at home in the basement. One half of the basement is carpeted and furnished with several bean bag chairs, her sewing machine, and a television set. When Mrs. Lisa is planning for the year (as she does in the summer) or for specific units, she brings home all the materials that she has gathered that might pertain to the planning task and then sits down on the rug or in a bean bag chair and spreads her materials around her. In this manner, she can

visualize all of her materials at once and experiment with different patterns of organization and sequencing. If she wants to see how posters or maps look, she tapes them to the walls. When she previews films or movies, she shows them on the wall and listens to tapes or records on her record player and tape recorder. Sometimes in the evening, she will watch a television show if she is doing a task not requiring constant attention. Other planning activities which Mrs. Lisa typically does at home include scheduling films from the media catalogue, previewing new instructional materials that have been purchased, and in the spring, ordering materials for next year.

Not all of Mrs. Lisa's school related activities involve planning. Planning is most emphasized in the summer, during breaks and at times during the year when she is developing an instructional unit. During two months of this study, Mrs. Lisa kept a diary of her activities at home. She spent on the average of two hours per night working on school related activities. This is similar to the average out-of-school work time reported in a study of English elementary teachers ($\bar{x}$ = 130.7 minutes per day) by Hilsum and Cane (1971). The most common activities that Mrs. Lisa did at home, listed in order of frequency of occurrence, include correcting papers, talking with parents on the phone, planning, and general organizational tasks. This is comparable to the English study where they found that most of the teachers' at home time was used for marking (26.2%), for lesson planning (15.3%), and for mechanical jobs (13.5%). The complete entries from Mrs. Lisa's diary are listed in Appendix E.

Chapter Summary

This chapter has attempted to describe those aspects of the classroom, curriculum, and students that shape life in Mrs. Lisa's classroom. The importance of such a description is based on a conviction that understanding the context of behavior is essential to understanding the behavior itself. The outline of the chapter was based on a dramaturgical or theatrical outline, where the classroom, teachers, students, and so forth, were characterized as elements essential to a good drama.

The chapter begins by describing the most general characteristics of the drama, the stage set by the school and the set and props that make up Mrs. Lisa's classroom. Next, the main characters--the teacher and the students--were described. A description of the script used in the classroom (the curriculum) was presented next, followed by a presentation of one school day as a typical plot.

A large part of the chapter was devoted to describing general characteristics of Mrs. Lisa's classroom. Discussed in this section were classroom organization, the weekly schedule, grouping for instruction, instructional goals, classroom discipline, creativity in teaching, and communication with parents. Finally, the setting and props that Mrs. Lisa uses for planning were discussed.

The following two chapters will present some hypotheses and models about teaching and planning in Mrs. Lisa's classroom. It is hoped that this chapter will serve as a useful backdrop for understanding and interpreting what is presented subsequently.

CHAPTER V

ACTIVITIES AND ROUTINES: A TECHNOLOGY OF TEACHING

The purpose of this chapter is to discuss two aspects of Mrs. Lisa's teaching that emerged as central factors in her thinking and in her planning for instruction. The chapter begins by discussing activities, their function as structural units of planning and action, their role as controlled behavior settings, and their major structural components. The second part of the chapter deals with routines in teaching, including the different types of routines observed in Mrs. Lisa's teaching and their role in planning and interactive teaching.

Part I: Teaching by Activities

Activities as Structural Units of Planning and Action

Activities may be broadly defined as self-contained organizational units for performing a specific function. Educational activities are designed to stimulate learning by firsthand experience--hence, educators usually refer to them as instructional or learning activities. Educational activities involve transactions between students and their environment--the teacher, other students, materials, and so forth.

Homans (1950) has suggested that the activity of the group is an important part of the sociological structure of a group. Smith and Geoffrey (1968) argued that the structure of activities is a major and often neglected part of classroom social-system analysis and devoted a full chapter to discussing activities, focusing primarily on daily

lessons. It is proposed here that activities not only play an important role in classroom organization and interaction, but are also a basic structural element in the teacher's decision making.

There are several reasons for suggesting that teachers use activities as the basic unit for decision making and planning. The first reason is that activities permit the organization of classroom action at a manageable level. Organizing instruction at the level of activities is much more specific and manageable than thinking about a subject matter or whole units of instruction, and is not as detailed and complex as thinking about and trying to organize statements of behavioral outcomes of instruction. Second, activities have as their focus some action--some "work" that is to be done. Since planning is chiefly concerned with future action, activities are a natural "action unit" for teachers to work with. Jackson (1968) suggests that teachers are more concerned with immediate behavioral outcomes such as enthusiasm and involvement in the classroom than they are with more long-term learning outcomes. If this is so, then the activity becomes a unit that can be used as a device to create enthusiasm and involvement as well as learning. Third, since activities are self-contained units, they can be tailored to fit into a specific time slot, and because of this somewhat independent characteristic, they may be arranged and sequenced into larger units of instruction. In short, it is because of their manageability, their orientation towards action, and their independence, that it is suggested that activities are a basic structural unit of both preactive and interactive teacher decision making.

Early in this study it became apparent that activities played a central role in Mrs. Lisa's thinking about instruction. Activities

first became visible in the classroom as the basis for organizing the day. Nearly all action and interaction in the classroom took place within the boundaries of an activity, and, for the most part, the remaining time was used for preparation for or transition between activities.

This organization was communicated to the students by way of the daily schedule. The first thing that Mrs. Lisa did each morning and afternoon after calling the roll was to go over the schedule. It was presented as a list of activities, some of which were punctuated by times. Two excerpts from the field notes serve as examples:

> Mrs. Lisa then goes over the afternoon schedule. It reads: Roll, Sharing, Change Jobs, Mindbender, Recess - 2:10, Read-a-Story, Weekly Reader, Spelling. (4/11)

> After school Mrs. Lisa erases the small blackboard and puts up tomorrow's schedule. It reads: Snews, Graphing, John's Shells, Weight and Height, Recess - 10:10, Field Trip - 10:30, Pass Out Papers, Clean up. (4/13)

As a result of experience, the activity names became for both the teacher and students a sufficient source of knowledge about what was to occur and how it would be carried out. The students often came over to look at the schedule to see what was coming up next, and the names of the activities served as an adequate cue to evoke Mrs. Lisa's plans for the activities.

It soon became apparent that activities also played an important role in Mrs. Lisa's planning decisions. In addition to her daily planning, Mrs. Lisa's weekly and unit planning was largely made up or organizing and sequencing activities. Her weekly planning as it was laid out in her plan book looked much like the schedules that she put on the blackboard each day. For some activities, page numbers and

additional notes were listed along with the activity name, though for most activities, the activity name alone was sufficient to indicate what would occur during the allotted time. When Mrs. Lisa planned units for science or social studies, the first step in her planning was to gather all the materials she could find on the topic, look through the materials, and then list activities that might be carried out as part of the unit. These activities were either based on the materials themselves or on ideas developed from the materials. Once a general sequence for the unit had been decided, Mrs. Lisa's planning largely involved the selection and sequencing of activities. This process can be seen during Mrs. Lisa's planning for a unit on dinosaurs for science:

> Mrs. Lisa begins by thinking out loud about where she wants to begin the unit. She decides that she wants to begin in the pre-dinosaur era and begins looking for a film strip on this era and appropriate activity to go with it. As she checks through the filmstrips, she relies on her preview comments. She also keeps the general sequence of the unit in mind. It is a time line following the evolution of reptiles and dinosaurs. She then begins writing activities in her plan book. She does one week at a time, first looking to see how many periods she had previously set aside for science and then fits in activities into each slot. (3/9)

Types of activity. Fifty-three activities[8] were identified in Mrs. Lisa's schedule. A complete listing of these activities grouped by subject matter is presented in Figure 5.1. Some activities such as roll, Snoopy Snews, finding mistakes in the schedule, and recess took place every day, while others such as cooking, holiday parties, and field trips

---

[8]"Activity: as used here refers to the generic activity type. A specific instance of an activity type will be referred to as activity occurrence.

Reading

Book Reports
Library
Phonics Workbooks
Read-a-Story (Student Reading to Class)
Reading Folders
Reading Groups
Reading Lab
Silent Reading (in Readers)
Story Reading (Teacher Reading to Class)
U.S.S.R. (Uninterrupted Sustained Silent Reading in Library Books)

Math

Math Games
Math Quizzes
Math Units
Math Workbooks

Writing Skills

Calendars (First of Month)
Creative Writing
Decoding (Spelling)
Finding Mistakes in Schedule
Handwriting Workbooks
Letter Writing (Classroom Post Office)
Mindbender
Newspaper (Class Newspaper)
Orange Suitcase (Grammar)
Pencil Pals
Remedial Handwriting Group
Spelling Bee
Spelling Folders
Spelling Test
Word Contest

Social Studies

Social Studies Unit
Snoopy Books
Snoopy Snews
Weekly Reader

Science

Science Units

Miscellaneous

Art in Room
Art with Art Teacher
Assembly
Block Patterns (Memory)
Change Jobs
Choice Time
Cooking
Directions (Listening)
Field Trip
Gym
Music with Music Teacher
Pass out Papers (Returning Graded Papers)
Station Work

Non-Instructional

Bucket Check (Desk Clean-up)
Holiday Party
Movies (Friday p.m.)
Recess
Roll
Treat

Figure 5.1 Activities in Mrs. Lisa's classroom

happened only once in several months. Most of the other activities took place at least once a week, though art with the art teacher occurred every other week, and activities like pencil pals and large group art activities in the room did not happen on a regular basis. Activities such as post-office, letter writing, math games, and reading folders were only used during winter term. The newspaper, Read-a-Story, silent reading, book reports, and remedial handwriting were a part of the schedule only during spring term.

Activity frequency and distribution. The number of academic activities occurring over the twelve-week period of winter term was tabulated to determine the frequency and distribution of activities in Mrs. Lisa's classroom. Omitted from these calculations were activities such as Snoopy Snews and finding mistakes since they occurred daily. Figure 5.2 illustrates the frequency of each activity during this period of instruction. To provide a breakdown of activities by subject matter, the mean number of activities for each day of the week were calculated along with daily and weekly activity totals (Table 5.1). This same information is portrayed graphically in Figure 5.3.

Figure 5.2 and Table 5.1 generally indicate that Mrs. Lisa followed fairly closely her weekly schedule for winter term. This schedule was illustrated in Figure 4.4 (p.90) and discussed in Chapter IV. There were on the average at least two reading-related activities each day except Friday which had only one. There was at least one math activity every day except Friday, and it was more common to have more than one math activity on Mondays and Wednesdays. Writing skills

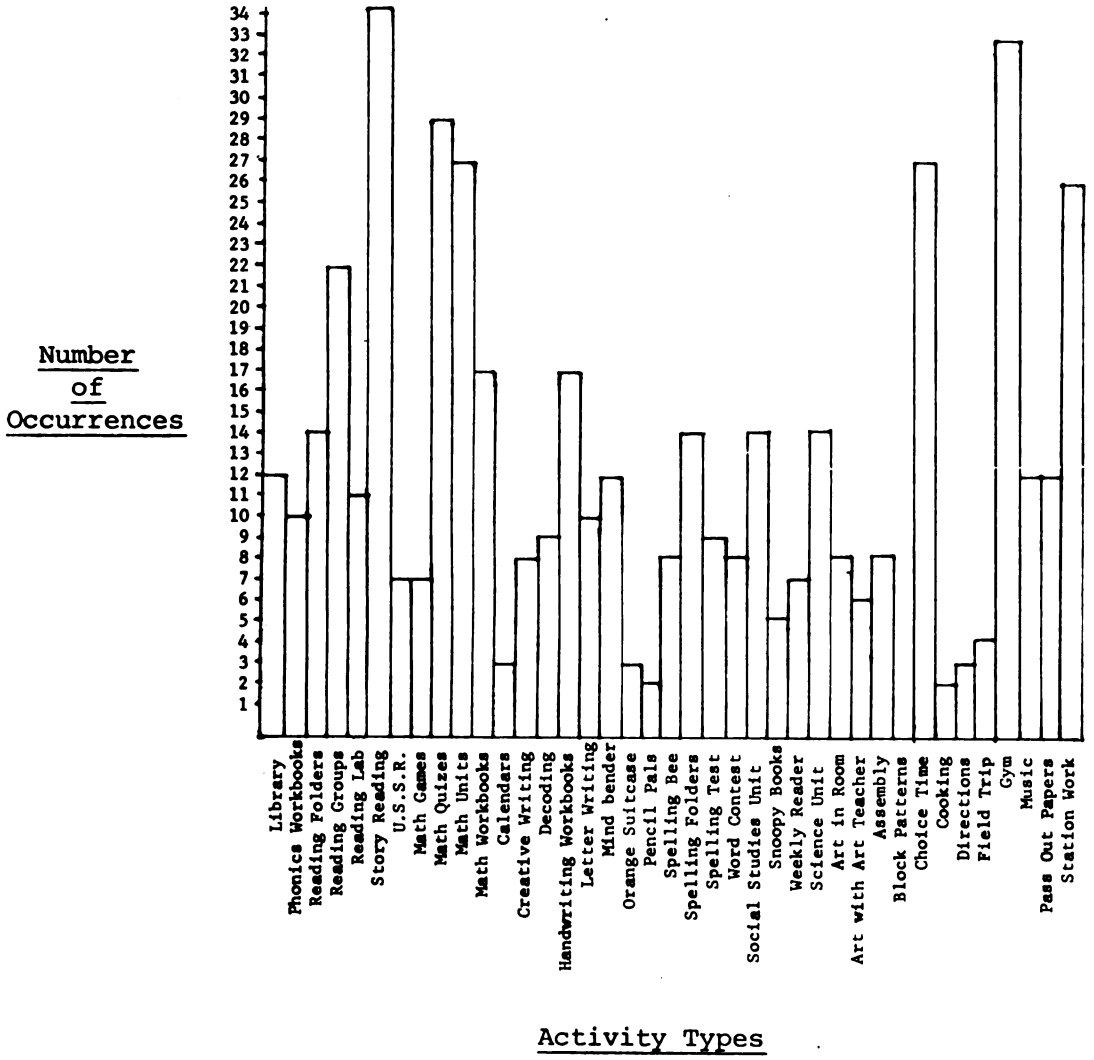


Figure 5.2 Frequency of instructional activities[a] in Mrs. Lisa's classroom during a twelve week period of instruction.[b]

[a]Omitting activities occurring daily.
[b]Fifty-nine school days.

Table 5.1

Mean number of activities[a] per day in each subject matter area during a twelve-week period of instruction.[b]

	Monday		Tuesday	Wednesday	Thursday	Friday		week
	full	(half)				full	(half)	
Reading	2.67	(.50)	2.00	2.66	2.00	1.12	(.00)	10.45
Math	1.88	(.00)	1.58	2.25	1.33	1.12	(.00)	7.04
Writing Skills	1.77	(2.50)	2.00	1.75	2.16	1.63	(.50)	9.31
Science and Social Studies	.77	(.50)	.75	.25	.83	1.00	(.25)	3.60
Miscellaneous	3.20	(2.50)	1.33	3.08	2.25	6.12	(3.25)	15.98
Total	10.29	(6.00)	7.66	9.99	8.57	9.87	(4.50)	46.38

[a]Omitting activities occurring daily (Snoopy Snews and finding mistakes in schedule.

[b]59 school days, 6 half-days (other half-day designated for professional development). Half-days included two Mondays (p.m. only) and four Fridays (a.m. only).

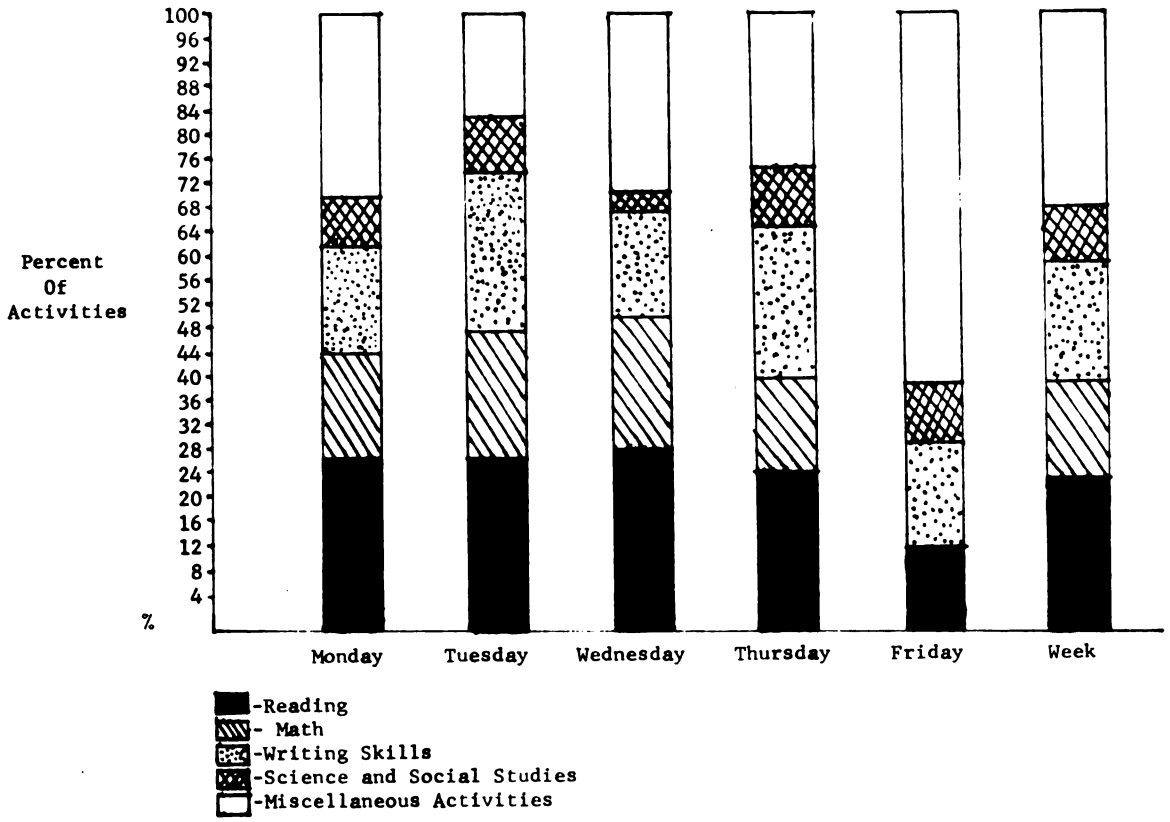


Figure 5.3 Mean percentage of daily activities in each subject matter area during a twelve-week period of instruction.

activities occurred more frequently than math activities, with two per day occurring quite frequently. Science and social studies activities occurred less frequently than scheduled. Figure 5.2 shows only fourteen science unit lessons and fourteen social studies unit lessons for the entire twelve week period (just over one of each type of lesson per week). There were four periods set aside in the schedule each week for science and social studies, but Mrs. Lisa acknowledged that in terms of her priorities these two subjects would be the first to be squeezed out of the schedule.

On the average about thirty percent of the day's activity was taken up by activities not subsumed under the subject matter groupings. Tuesday averaged the smallest number of these "miscellaneous" activities while Friday had the largest number (over 60%). One must be cautious in interpreting Figure 5.3 since it represents the percentage of total activities occurring in each subject matter area not the amount of time spent in each area. Thus, the hour spent with the art teacher every other Tuesday is represented as one activity as is the fifteen minutes that Mrs. Lisa might spend reading a story to the class on the same day. The time spent in various activities will be covered in a later section.

To summarize, activities were a salient feature of the planning and instruction in Mrs. Lisa's classroom, so much so, that her instruction might be best described as "teaching by activities." This section has discussed the notion of activities as structual "building blocks" for instruction. The next section will elaborate on this notion by discussing the function that activities play as behavior settings. Also described in this section were the types, frequency, and

distribution of Mrs. Lisa's instructional activities. The characteristics of these activities will be discussed in the section on features of instructional activity.

Activities as Controlled Behavior Settings

In Chapter I, the position taken by ecological psychologists regarding the interdependence between behavior and the environment was discussed briefly. It was stated that researchers such as Barker and Doyle propose that the environment makes certain demands on inhabitants that shape and set limits on their behavior. They further argue that behavior occurs in ecological units referred to as behavior settings. Kounin (Institute for Research on Teaching, 1977) states that behavior settings have four distinct features: (1) definite temporal and spatial boundaries, (2) a physical milieu with props (books, pencils, and so forth), (3) a standing pattern of behavior, and (4) interaction between the physical components and the standing pattern of behavior. He further states that behavior settings exist independent of a person's perception and that behavior taking place in a certain environment is consistent with behavior in other environments of the same type.

Activities, as defined in this study, are equivalent to behavior settings, although they may be more accurately described as controlled behavior settings. Not only is the behavior of the teacher signaled and controlled by the setting, but the setting itself has been largely created and controlled by the teacher ahead of time. Through planning, the teacher is able to structure activities to increase the probability of signaling and eliciting behavior that conforms to his or her

purposes. Therefore, even if the teacher's behavior in the activity is largely a reaction to the pupil's actions in the setting, general boundaries and guidelines have already been established for behavior through preactive planning.

This type of interaction with the environment has generally been ignored by information processing psychology and obscures the distinction that has traditionally been made in studies of problem solving or decision making between the task environment and the problem space. Information processing theory assumes that because of limitations in human information processing capabilities, complex task environments are simplified and represented in the mind as problem spaces. Thus, rather than confronting the environment and all its complexity, a problem solver or decision maker creates a mental representation of a portion or certain characteristics of the environment and searches for a solution within that space.

Most of the tasks investigated by information processing psychology have been relatively simple problems such as deciding on a chess move or solving a cryptarithematic problem, all of which can be solved in a fairly short period of time (or at least at one sitting). By focusing on tasks of this type, they have been able to describe in detail procedures and methods used to simplify the task environment into a manageable problem space. What these simple problems have been unable to represent is problem solving or decision making over extended periods of time (days or weeks). The exception to this pattern was Clarkson's (1962) study of a bank trust investment officer discussed in Chapter III. Though his study examined decision making over a long

period of time (several months), he was always looking at the same well defined task.

As defined in Chapter I, planning is concerned with developing a framework for guiding future action. One way to guide future action is to shape, according to one's perceptions and purposes, the environment in which it will occur. When this happens, the planner is attempting to mold the task environment to conform better to the problem space within which he is functioning. In other words, the planner not only simplifies the task environment internally by thinking within a specific problem space, but also goes on to actually change and simplify the external environment based on this internal representation. This process is illustrated in Figure 5.4.

This reshaping of the task environment based on one's initial conceptualization of the situation takes place in a variety of ways through teacher planning. Three common ways this occurred in Mrs. Lisa's classroom were through scheduling, grouping, and rearranging the classroom. Scheduling deals with one of the major features of the teaching environment--time. By setting a weekly schedule at the beginning of each term, Mrs. Lisa determined the relative emphasis on each subject in her curriculum by allocating a specific number of periods each week to activities and by setting the amount of time provided for each activity.

Various forms of grouping also influenced the task environment for instruction in Mrs. Lisa's classroom. Whether an activity included the whole class or specific groups of children, grouping greatly influenced the type and quality of interaction Mrs. Lisa was able to have with the students. Through the rearrangement of the physical

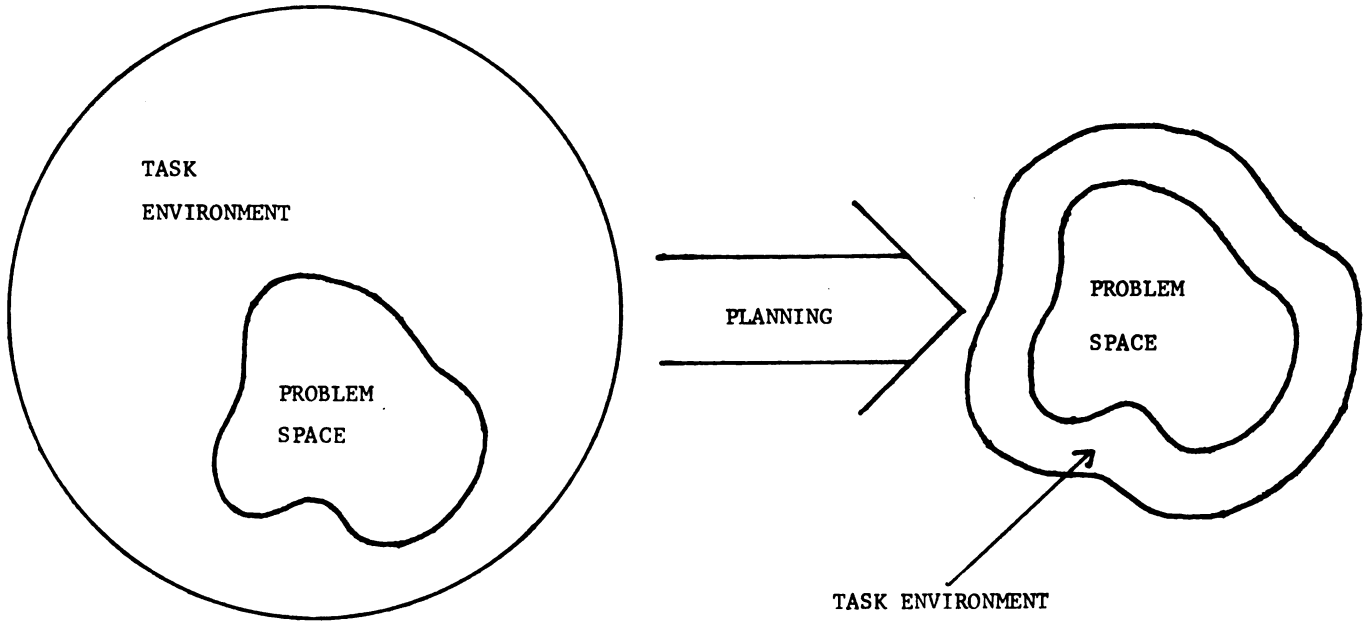


Figure 5.4 Reshaping the task environment by planning.

structure of the classroom, Mrs. Lisa was able to influence the types of task environments available for instruction. Her provision for different settings such as the rug, the tables for small groups, and the art lab are examples of how her conceptualization of appropriate learning settings for various activities influenced the spatial and geographic boundaries in which these activities took place.

These examples have shown three features of the classroom environment that may be manipulated by the teacher to influence student and teacher behavior. Since most of Mrs. Lisa's instruction takes place within the context of instructional activities, components of instructional activities subject to manipulation through planning have been identified and will be discussed in the next section.

Features of Instructional Activities

In the previous sections, activities were portrayed as the basic structural unit of planning and action in Mrs. Lisa's classroom, and their function as controlled behavior settings was proposed. To understand better Mrs. Lisa's thinking about instructional activities, an analysis of activity features was undertaken.

In the course of the study, seven features were identified that characterize instructional activities in Mrs. Lisa's classroom. These features are basically an elaboration of Barker's and Kounin's features of behavior settings expanded to include components especially salient in instructional settings. These components are:

1. Location
2. Structure and Sequence
3. Duration

4. Participants
5. Acceptable Student Behavior
6. Instructional Moves
7. Content and Materials

It is proposed that for each instructional activity in Mrs. Lisa's classroom, planning decisions were made about each of these features. In some activities, these decisions were made quite often, but in most, decisions were only made once or twice and the activity became fixed or routinized. This routinization of activities will be discussed in the second part of this chapter. Before proceeding to that, however, the characteristics of Mrs. Lisa's instructional activities will be elaborated further by discussing each of the seven features listed above.

Location. Location refers to the physical location of an activity. The activity might take place on the rug, at the students' seats, at one of the tables, or in another location in the building. For most activities, location was specified the first time the activity occurred although for some activities such as choice time or the word contest, the activity might take place at many different places in the room. In Mrs. Lisa's classroom, the most common locations for activities were the students' seats and on the rug. Activities also took place at the round tables or at other locations around the room. For several activities, the students could pick where they might sit. Activities occurred outside the room at the library, art room, gym, music room, reading lab, and in the classroom next door. Field trips took place at various locations around the community. Figure 5.5 lists primary and, for some activities, secondary locations for each of Mrs. Lisa's activities.

In the Classroom

At Seats

Book Reports (RT)[a]
Reading Folders (RT)
Phonics Workbooks (RT)
Math Quizzes
Math Units, (R,RT)
Math Workbooks
Calendars
Creative Writing
Decoding
Handwriting Workbooks
Letter Writing
Mindbender
Newspaper (R,RT,OR)
Orange Suitcase
Pencil Pals
Spelling Folders
Social Studies Units (R)
Snoopy Books
Weekly Reader
Science Units
Art in Room
Station Work
Bucket Check
Silent Reading

On the Rug

Read-a-Story
Story Reading
Finding Mistakes
Remedial Handwriting
Snoopy Snews
Block Patterns
Directions (S)
Pass Out Papers
Roll
Treat
Spelling Test

At Round Tables

Reading Groups
Cooking

Other Locations

Spelling Bee - two lines near front chalkboard
Change Jobs - at job board

Student Choice

U.S.S.R.
Holiday Party
Choice Time
Word Contest
Math Games

Outside the Classroom

Assembly	- Gym
Library	- Library
Music	- Music Room
Reading Lab	- Reading Lab
Gym	- Gym
Art with Art Teacher	- Art Room
Recess	- Playground (IR when raining)
Movies	- Classroom Next Door

Figure 5.5 Locations of activities in Mrs. Lisa's classroom

---

[a]Secondary locations are in parentheses

S - Seats
R - Rug
RT - Round Table
OR - Out of Room
IR - In Room

Structure and sequence. In their analysis of daily lessons as activities, Smith and Geoffrey propose four phases or episodes of a lesson. First, a lesson initially involved some type of opening or entry, involving some type of directive such as "turn to page 254" or an illustration based on common experience. Next, the body of the lesson took place, involving such things as reading from the text, reciting, or teacher questioning. Third, the lesson closed with some type of summary or with an assignment of text questions, and finally, an "epilogue" occurred in the form of a study period or homework.

Activities in Mrs. Lisa's classroom differed from lessons in Geoffrey's classroom in several ways. First, Geoffrey did most of his teaching from texts, whereas Mrs. Lisa used more varied materials in her activities. Second, Geoffrey's lessons appeared to be large group oriented, as opposed to the many small group or individual activities used by Mrs. Lisa. Third, whereas Geoffrey was teaching junior high students, Mrs. Lisa was teaching first and second graders. These differences require a structure for Mrs. Lisa's activities that is different from the structure of Geoffrey's lessons.

The general structure or sequence of an activity in Mrs. Lisa's classroom included three major components. In beginning an activity, time was almost always involved in set-up. This included such things as passing out materials, directing students to certain locations in the room, rearranging desks, pulling down shades or projection screens, or even going to another place in the building like the library or music room. Set-up here involved more than the directive or illustration opening a lesson in Geoffrey's classroom since the variety of materials and groupings in Mrs. Lisa's classroom generally necessitated

more complex preparations than opening a textbook. In many activities, set-up also involved giving directions for the use of the materials that the students had been given or to provide addenda or changes in the procedures that the students were accustomed to following in an activity.

Once the activity is set up, the second or lesson phase occurs. For whole class or teacher-run activities, the lesson may involve behavior such as reading, reciting, and questioning that dominated Geoffrey's lessons. Often, however, the lesson involved private work sessions in workbooks or folders. During these sessions, Mrs. Lisa might be monitoring the group as a whole or working with one group as in reading or math. More often than not, the lesson was closed by a directive from Mrs. Lisa to proceed into the third phase of the activity rather than by summarizing or otherwise formally closing the lesson. Also absent was the assignment of questions or homework common to Geoffrey's lessons.

The third phase of an activity may be called take-down. For some activities such as cooking, art, or choice time, this was often a major undertaking. For others, it might only involve returning one's text or workbook to the book rack or returning to one's seat. In most group activities, this also involved having one or two students collect worksheets, folders, or books and put them away. In all activities, the take-down phase involved some rearrangement or regrouping of materials or participants leading into the set-up phase of another activity or to a break such as recess or lunch.

Nearly all of Mrs. Lisa's activities included the three phases of set-up, lesson, and take-down. Although most activities followed this

basic sequence, some had very simple structures while others were more complex. The complexity of an activity might be characterized in many different ways: numbers of teacher moves, number of student behaviors, types and complexity of student-teacher interactions, complexity of materials, and so forth. Since this study was concerned about how complexity affected Mrs. Lisa's planning decisions, complexity was defined in terms of the number of different roles,[9] or orientations, that Mrs. Lisa would need to take on during an activity. It was hypothesized that activities become more complex for the teacher as the number of roles demanded by the activity increases.

The categories used to define Mrs. Lisa's role(s) during an activity are modeled after Gump's categories of "teacher leadership pattern" (Gump, 1967). They include watcher-helper, participant, action director, recitation leader, instructor-demonstrator, reader, tester, and non-in-activity. Definitions of these categories are provided in Figure 5.6. Although many other conceptions of teacher role have been proposed (e.g., Amidon and Hunter, 1967; Fishburn, 1966; Lundgren, 1972; Morine and Morine, 1973; Perkins, 1964), Gump's category desig-nitions were chosen primarily because they were developed for an used to analyze field notes and written accounts of classroom interaction. It was felt that it would be easier to use this type of system for the analysis of field notes in this study than categories primarily designed for use in classroom observation instruments.

---

[9]Teacher role is introduced here as a way to conceptualize and measure activity complexity. It will be discussed in more detail in the section on instructional moves.

(T = Teacher)	
1. Watcher-Helper	T is watching over (monitoring) or helping a working group of individuals. May circulate, stand at back, or be at desk. If at desk, is at least periodically involved with activity affairs.
2. Participator	T is not leading activity, but participates with students in activity.
3. Action Director	T gives directions or manages activity throughout lesson phase, can lead or act as master of ceremonies. T is key to action, is making demands for doing, but is not supplying the core action.
4. Recitation Leader	T asks for reciters, comments on answers, may quiz. Code activities not in recitation format if questioning or asking for student input is prominent mode of teaching.
5. Instructor-Demonstrator	T tells or shows students how to make something, what the facts are, etc. Does not use recitation format. Does not ask for contributions. May answer pupil questions; may question pupils briefly to check them out, but this is only a small part of the teaching effort.
6. Reader	T reads to pupils.
7. Tester	T can give questions either orally or in written form. Monitoring may involve "watching" but all teacher supervised testing is coded "tester."
8. Not in Activity	T not helping, not clearly and consistently attending to activity during lesson phase; T not key to pupil action. T usually busy with another activity.

Figure 5.6 Definitions for teacher-role categories (after Gump, 1967)

Teacher-role was chosen as a measure of activity complexity for several reasons. First, teacher-role seemed to be a more meaningful unit of teacher behavior than verbal or pedagogical moves, utterances, or ventures. (See Dunkin and Biddle, 1974, for a review of these different units.) Teacher-role involves a more wholistic unit of behavior and one that can be easily identified in field notes. Second, the notion of teacher-role also reflects student behavior occurring at the same time. One can conceive of types of student behavior as a kind of mirror image to the teacher's role. For instance, if the teacher is functioning as a recitation leader, it is reasonable to assume that most students are functioning as participants in a recitation session; and in the same manner, if the teacher-role is that of a watcher-helper, then one can assume that the students are involved in some sort of individual or group work not centered around the teacher. This reflection of student behavior in teacher behavior was illustrated in Gump's (1967) analysis of classroom behavior settings.

To assess the complexity of the activities in Mrs. Lisa's classroom, the lesson phases of activities during a representative three week period in winter term were coded using the categories defined in Figure 5.6. Of the thirty-seven types of instructional activity that occurred in this period, only three activities ever involved three roles, and only eight activities involved two different teacher roles during the activity; the remaining twenty-six activities involved only one teacher role. See Table 5.2 for a complete listing of the number of roles observed in each activity. It seems reasonable to postulate that complex activities (activities involving more than one teacher-role) are more demanding on the teacher during planning and during the

Table 5.2

Teacher-roles observed in activities during a representative three week period in winter term.

Activity	Frequency and Roles	Typical Number of Roles	WH	P	AD	RL	ID	R	T	NA
Library	P AD/P AD/	2		+	+					
Phonics Workbooks	WH/WH/	1	+							
Reading Folders	WH/WH/	1	+							
Reading Groups	RL R/RL/RL/RL/	1				+		+		
Reading Lab	WH AD/WH AD/WH AD/	2	+		+					
Story Reading	R/R/R/R/R/R/R/R/R/R/	1						+		
U.S.S.R.	P/P/	1		+						
Math Games	AD WH/	2	+		+					
Math Quizzes	T/T/T/T/T/T/T/T/	1							+	
Math Units	AD WH/RL AD/RL T/WH ID/	2	+		+	+	+		+	
Math Workbooks	WH/WH/	1	+							
Calendars										
Creative Writing	AD WH/WH/	2	+		+					
Decoding	WH RL/	2	+			+				
Handwriting Workbooks	ID/ID/ID/	1					+			
Letter Writing	WH/WH/	1	+							
Mindbender	RL/RL/RL/	1				+				
Orange Suitcase										
Pencil Pals	ID WH/	2	+				+			
Spelling Bee	AD/AD/AD/	1			+					
Spelling Folders	WH/WH/	1	+							
Spelling Test	T/T/	1							+	
Word Contest	P/P/	1		+						
Social Studies Unit	AD RL ID/RL WH ID/ID RL AD/	3	+		+	+	+			
Snoopy Books										
Weekly Reader	RL/	1				+				
Science Unit	ID RL/RL ID/	2				+	+			
Art in Room	WH/	1	+							
Art with Art Teacher	NA/	1								+
Assembly	P/P/	1		+						
Block Patterns										
Change Jobs	AD/	1			+					
Choice Time	NA/NA/NA/NA/NA/NA/NA/	1								+
Cooking	ID P AD/	3		+	+		+			
Directions										
Field Trip	AD P WH/	3	+	+	+					
Gym	NA/NA/NA/NA/NA/NA/NA/NA/NA/	1								+
Music	NA/NA/NA/	1								+
Pass Out Papers	AD/AD/AD/	1			+					
Station Work	NA/NA/NA/NA/NA/	1								+
Find Mistakes	RL/RL/RL/RL/RL/RL/RL/RL/RL/RL/RL/RL	1				+				
Snoopy Snews	WH/WH/WH/WH/WH/WH/WH/WH/WH/WH/WH/WH	1	+							
		Totals -	15	6	11	8	6	2	3	5

WH - Watcher Helper
P - Participant
AD - Action Director
RL - Recitation Leader
R - Reader
T - Tester
ID - Instructor/Demonstrator
NA - Not in Activity

activity. If one of the aims of classroom organization is to simplify these demands, then one might predict that complex activities occur less frequently than more simple activities. To test this, the frequency of complex and simple activities was calculated for the twelve-week period of winter term. The results of these calculations are shown in Table 5.3. As can be seen, activities that involved only one teacher-role occurred on the average of fourteen times during the term. Activities usually involving two teacher-roles occurred on the average of eleven times, and activities involving three teacher-roles took place on the average of between six and seven times. Of the 481 activity occurrences during this period, only twenty or four percent were complex activities involving three teacher roles. Including complex activities with two roles only brings the total to twenty-three percent. Thus, seventy-seven percent of the activity occurrences during this twelve-week period were simple activities.

To summarize, activities in Mrs. Lisa's classroom usually were made up of three phases: set-up, lesson, and take-down. The complexity of an activity was defined by the demands put on Mrs. Lisa in terms of teacher-roles. Using this definition of complexity, it was found that approximately seventy-seven percent of Mrs. Lisa's activities only involved one teacher-role while only nineteen percent involved two roles, and only four percent involved three or more.

Duration. The duration of an activity simply refers to the length of time an activity lasts. Recently, it has become popular in discussions of classroom learning to focus on allocated time and engaged time or time on task. (See, for instance, Wiley and Harnischfeger, 1974; Harnischfeger and Wiley, 1976; Berliner, et al., 1976).

Table 5.3

Frequency of complex and simple activities during a twelve-week period of instruction in winter term.[a]

Teacher-role	Number of Roles	Number of Activities	Total Number of Occurrences	Mean Number of Occurrences per Activity
Complex	3	3	20	6.66
Complex	2	8	90	11.25
Simple	1	26	371	14.26

[a]calculated only on the thirty-seven activities that occurred during the three-week period used for identifying activities as simple or complex (see Table

The field notes recorded in this study were not of sufficient detail to report a comparison of allocated and engaged time for each activity observed in this study, although it is possible to approximate the average time spent in each activity. Two factors make this possible. First, time allocations for activities were made to a large degree when Mrs. Lisa set up her weekly schedule for the term. (See Chapter IV for a description of this process.) Second, in setting up the schedule, it was arranged so that adequate set-up and take-down time was built into the activities. Because of this, it was rare for activities to fall short of or to go over the scheduled time. (Several times in casual conversations, she remarked that providing for these times and not crowding activities had been one of the major things that her experience had taught her.) Also, the four instructional blocks framed by the recess and the lunch break provided fairly rigid frames for Mrs. Lisa's activities, and it was rare for an activity to be carried across these boundaries. For these reasons, the duration of Mrs. Lisa's activities rarely deviated from the scheduled time.

Most contemporary studies of time allocation and time on task do not make the distinction between the complete activity and the portion that has been referred to here as the lesson phase. Though it has not been documented, it seems reasonable to conjecture that when teachers are allocating time for an activity, they are including some notion of the set-up and take-down time involved. When researchers examine time on task behavior, they assume that the difference between the allocated time and actual activity time is due to poor planning or error on the part of the teacher. This error is often relegated to transition time not accounted for in the teachers' allocations. If one uses the

broader notion of an activity proposed here, transition time drops almost to zero. This is because what has been traditionally called transition time is absorbed by the set-up and take-down phases.

Using this broader notion of an activity, time allocated to activities in the weekly schedule or in the daily schedule on the blackboard rarely deviated from actual time spent in Mrs. Lisa's teaching. Of course, there were unexpected occurrences such as fire drills, equipment failure, surprise assemblies, and so forth, but generally Mrs. Lisa adhered closely to her planned activities. The approximate allocated time for each activity is presented in Figure 5.7. These times were computed from Mrs. Lisa's weekly schedules, her plan book, and from the field notes. Most of Mrs. Lisa's activities were in the fifteen to thirty minute range, averaging a little over twenty-five minutes. Table 5.4 provides a summary of activity durations broken down by subject matters.

The average duration of complex activities was contrasted with the average duration of simple activities using the designations in Table 5.2. The twelve activities labeled complex had an average duration of forty-five minutes, while the twenty-six activities labeled simple averaged only twenty minutes. This seems to indicate that within activities involving multiple roles, there was not rapid role shifting. Once Mrs. Lisa was oriented a certain way, she did not quickly shift to another teaching-role. In coding teacher-roles for Table 5.2, a shifting back and forth between roles was rarely encountered. Once Mrs. Lisa shifted orientations, she usually did not switch back to a previous orientation. The shortest activities involving two teacher roles were math units, creative writing and decoding (twenty minutes).

Reading	
Book Reports	- 30 min.
Library	- 45 min.
Phonics Workbook	- 20 min.
Read-a-Story	- 15 min.
Reading Folders	- 20 min.
Reading Groups	- 15 min.
Reading Lab	- 30 min.
Silent Reading	- 20 min.
U.S.S.R.	- 30 min.

Math	
Math Games	- 50 min.
Math Quizzes	- 10 min.
Math Units	- 20-30 min.
Math Workbooks	- 30 min.

Writing Skills	
Calendars	- 20 min.
Creative Writing	- 15-30 min.
Decoding	- 20 min.
Finding Mistakes in Schedule	- 3 min.
Handwriting Workbooks	- 20 min.
Letter Writing	- 15 min.
Mindbender	- 20 min.
Orange Suitcase	- 15 min.
Pencil Pals	- 30 min.
Remedial Handwriting	- 20 min.
Spelling Bee	- 15 min.
Spelling Folders	- 15 min.
Spelling Test	- 10 min.
Word Contest	- 15 min.

Social Studies	
Social Studies Units	- 50 min.
Snoopy Books	- 20 min.
Snoopy Snews	- 5 min.
Weekly Reader	- 20 min.

Science	
Science Units	- 50 min.

Miscellaneous	
Art in Room	- 20-50 min.
Art with Art Teacher	- 60 min.
Assembly	- 20-40 min.
Block Patterns	- 5 min.
Change Jobs	- 15 min.
Choice Time	- 5-20 min.
Cooking	- 40-90 min.
Directions	- 15 min.
Field Trip	- 2-4 hours
Gym	- 30 min.
Holiday Party	- 20 min.
Movies	- 20 min.
Music	- 30 min.
Pass Out Papers	- 15 min.
Recess	- 15 min.
Roll	- 2 min.
Station Work	- 10 min.
Treat	- 15 min.

Figure 5.7 Approximate allocated times for activities in Mrs. Lisa's classroom

Table 5.4

Mean duration of activities by subject matter area.

Subject Matter	Mean Duration[a]
Reading	25 min.
Math	27 min.
Writing Skills	18 min.
Social Studies	24 min.
Science	50 min.
Miscellaneous[b]	20 min.
All Activities[b]	26 min.

[a]Rounded to nearest minute

[b]Not including cooking and field trips

The shortest activity involving three roles was social studies units (fifty minutes). One reason for this possible relationship between duration and complexity and the lack of shifting back and forth between roles is that Mrs. Lisa's role shifts seem to be related to shifts in tasks within activities. Roles shifted with tasks and remained the same until the task was over. For instance, the regular shift in teacher-roles occurring in reading lab accompanied the shift in task from workbook-tape tasks to reading games. In decoding, the role shift accompanied the task shift from individual coding of one's own spelling words to a group decoding of a sentence written on the board.

Participants. The participants in an activity were determined largely by decisions about grouping. Some activities included the whole class and some included only a few students. When students were divided into several different groups, this was usually done prior to the first session of an activity, although Mrs. Lisa did move students from one group to another as they improved or had difficulty with certain skills or concepts. Students were grouped for reading in reading groups, reading lab, book reports, phonics workbooks and reading folders. In math, students were grouped for math units and workbooks (same grouping) and for math quizzes (different grouping). The only writing skills activity grouping was for spelling (four groups) and for remedial handwriting (one group). Mrs. Lisa had no individual teaching times scheduled, and the rest of her activities were conducted as a whole class.

Acceptable student behavior. Acceptable and unacceptable student behavior was specified in every activity. In some activities, Mrs. Lisa specified this behavior before an activity began, although in

others students learned it through trial and error. This learning of acceptable behavior for specific social situations has been portrayed by sociolinguists and anthropologists as a task of gaining "social competence" (Hymes, 1974). In education, this has been examined in the context of "participation structures" (Phillips, 1972) in the classroom. This has involved an examination of how children learn to interpret and predict the shifting rights and obligations of those involved in social interactions such as group discussion. Much of this work (Phillips, 1972; Schultz, 1976) has focused on how children get turns at speaking and how different teacher roles affect appropriate behavior in different cultural groups.

Interaction within activities was not a focus of this study, but the importance of teaching or letting the students learn acceptable and appropriate forms of interaction was acknowledged by Mrs. Lisa. Much of her time and energy during fall term was wrapped up in teaching the students their rights and obligations in each activity. In her own words, "It takes all fall to get the kids to where you can do something with them in the winter and spring." Many of Mrs. Lisa's goals for her students revolve around helping the students to become "responsible citizens" in the room. This involves such things as being polite, cooperative, and independent. These emphases are apparent in the behaviors Mrs. Lisa most often mentioned to the students. These were the general noise level of the class during an activity, freedom to leave one's seat, talking in turn, listening politely when someone is speaking, and paying attention to instructions. By winter term, Mrs. Lisa's success in eliciting appropriate (desired) behavior was indicated by the rarity of having to disrupt an activity to

discipline a student. Appropriate behavior seemed to be well enough understood by the students so that simple cues such as a gesture, a look, or a word would terminate undesirable behavior.

Instructional moves. Mrs. Lisa's behavior in an activity provided the other component necessary to the participation structure of an activity. This behavior is characterized as instructional moves directed at achieving some outcome. Within an activity, the teacher may perform in many different ways. Some of the moves most apparent in Mrs. Lisa's instruction were giving instructions, questioning, presenting information, monitoring, evaluation, and feedback. Since most activities included a combination of several or many of these moves, Mrs. Lisa's instructional behavior was represented earlier in terms of teacher-roles. Since this study was not primarily interested in Mrs. Lisa's instructional strategies or style, no detailed analysis was conducted on her interactive teaching behavior. From the tabulations of teacher-roles calculated to determine the complexity of an activity, it is possible to get some picture of the variety and frequency of orientations that Mrs. Lisa had in various activities. The frequency of various teacher roles in activities during this period is summarized in Table 5.5. Because of the apparent stability of Mrs. Lisa's roles during this period, one can confidently assume that these roles represent her orientations throughout winter term. (A spot-check of the field notes during other weeks revealed almost no deviations in these roles.)

The frequency of the teacher-roles in Table 5.5 indicates that Mrs. Lisa more often took a more student-centered role as a watcher-helper or action-director than a more teacher-centered role, such as recitation leader or instructor-demonstrator. It is important to note

Table 5.5

Frequency of Mrs. Lisa's teacher-roles during a three-week period of instruction.

Role	Frequency of Teacher-Role	Percent[a] of Time	Percent of Time (Gump, 1967)
Watcher-Helper	14	18	17.2
Participant	6	11	0.2
Action Director	11	17	23.1
Recitation Leader	8	13	27.8
Instructor-Demonstrator	6	10	3.2
Reader	1	7	3.1
Tester	3	4	2.7
Not-in-Activity	5	20	22.7

[a]See text for an explanation of how this was estimated.

that these counts do not indicate amount of time spent in each activity but only the number of times each role was identified in an activity. To provide a rough estimate of the percent of time spent in each teacher-role, each role occurrence was weighted by multiplying the appropriate duration of the activity (Figure 5.7) by the number of occurrences during the three-week period (Table 5.2). For activities that involved more than one role, the total time was divided by the number of roles. (This assumes somewhat incorrectly that each role had equal time in the activity; but for estimation purposes, it should be accurate enough.) For activity durations where a range of time was given, an average time was used.

By estimating the percent of time spent in each teacher-role during this period, a comparison can be made with another study using similar notions of teacher-role. Gump (1967) observed six third-grade teachers for two-days each, using specimen records, time-lapse photographs, and a multifaceted category system observing "segments" of the classroom day and teacher and pupil "acts." The percent of time these teachers spent in the teacher-roles is listed in the third column of Table 5.5. An obvious difference between Gump's teachers and Mrs. Lisa is that Gump's teachers have 91% of their activities concentrated in four roles, whereas Mrs. Lisa's roles are much more evenly distributed. Mrs. Lisa spent less time as a recitation leader, but spent more time as a participant, instructor, demonstrator, reader, and tester. Thirty-five percent of Mrs. Lisa's time was spent directing or watching student action in an activity as opposted to 23% spent actively instructing or leading a recitation section. This is fairly close to times reported for Gump's teachers and may be as much a function of

the nature of teaching in early primary grades as a particular teaching style.

Content and materials. The seventh activity characteristic identified in this analysis was content and materials. The general content of an activity was set by the subject matter orientation of most activities. Within this framework, Mrs. Lisa had to determine specific content that would be covered during a lesson and decide what materials she would provide for the students. These types of decisions were a major component of Mrs. Lisa's weekly and daily planning since most periods of instruction necessitated new decisions about what would be taught and how it would be presented.

Decisions about content and materials were the most frequent activity-related decisions Mrs. Lisa made in her planning. Since content of her instruction was nearly always delivered through or in conjunction with some materials, these decisions were closely intertwined. Through daily observations of Mrs. Lisa's judgment and selection of teaching materials and through more controlled observation in the Teacher Planning Shell, eight factors or "cues" were identified that were frequently used when Mrs. Lisa judged the usefulness of materials. (No design was implemented that produced an estimate of the importance or weighting of these cues, and this list is based on considerations of factors that repeatedly "surfaced" in discussions and in her "thinking aloud.") These factors are (1) the format of materials (e.g., text, ditto, workbook, manipulatables, games, films, or kits), (2) the attractiveness and workmanship of the materials, (3) whether or not the materials were consumable (whether the students could write on them or pages could be torn out--a frequent consideration with

workbooks), (4) whether they could be easily modified or adapted to serve her purposes, (5) the clarity of instructions for the students, (6) whether a recording or evaluation system was provided with the materials, (7) the set-up time involved for her, (8) whether or not there would be enough materials for a group or for the whole class, and (9) content. If materials failed to meet her standards in too many areas, then it was not uncommon for Mrs. Lisa to combine several different materials or to borrow ideas and make her own. In making decisions about content, seven more factors were identified as frequent concerns of Mrs. Lisa. These include: (1) difficulty level, (2) sequence and order of content presentation, (3) emphasis of the content (skill, knowledge, strategy, etc.), (4) meaningfulness, (5) length of content presentation (e.g., lesson, film, or task), (6) the "fit" of the content with her goals (and the district objectives), and (7) the potential that the content had for integration with other contents, lessons, and activities. Each of the cues identified as being related to judgments of content and materials could be a subject of a more detailed study of teacher judgment. Because of the scope and nature of this study, the relative frequency and importance of these factors were not described. A somewhat more complete picture of when these cues were most prominent in Mrs. Lisa's planning is provided in the next chapter.

Summary

Thus far, this chapter has described one aspect of Mrs. Lisa's instructional technology--teaching by activities. The role of activities as structural units in planning has been described as well as their function as controlled behavior settings in her teaching. Seven

features of instructional activities have been identified and described as concerns in Mrs. Lisa's planning.

Mrs. Lisa's planning for instruction involved making decisions about each of the features of an activity mentioned above. Decisions about some features were more prominent at certain times of the year or term, and not all of these decisions were part of her on-going planning. A mechanism used by Mrs. Lisa to establish and regulate these activities and to simplify the planning task will be discussed in the second part of this chapter.

Part II: Routines in Teaching

It was suggested in Chapter I that planning functions to reduce the complexity and to increase the predictability of the teaching environment. In the first part of this chapter, activities were identified as the basic structural unit of Mrs. Lisa's planning and teaching. The purpose of this section is to discuss a mechanism Mrs. Lisa used to deal with the many activities used in the classroom, namely, routines.

Routines are established procedures, or programs, whose main function is to control and coordinate specific sequences of behavior. Routines are an efficient and common mode of operation in situations where action and behavior are repetitive. However, the role and function of routines have been rarely studied and usually only in the context of business organizations. The most extensive treatment of routines was undertaken by March and Simon (1959) where they refer to routines as performance programs.

Routines play a major role in classroom organization and in the teacher's thinking and planning for instruction. In this classroom, routines functioned as the major mechanism for increasing the predictability and reducing the complexity of the teaching environment. Thus, planning for Mrs. Lisa largely involved decision making about the selection, organization and sequencing of routines.

Types of Teaching Routine

Four different types of routine were identified in Mrs. Lisa's planning and teaching: (1) activity routines, (2) instruction routines, (3) management routines, and (4) executive planning routines. Each of these routines will be discussed in turn.

Activity routines. Activity routines function to control and coordinate the components of classroom activities. It was primarily by establishing activity routines that Mrs. Lisa simplified the tasks of planning and teaching in her classroom. Earlier in the chapter, seven components of activities in Mrs. Lisa's classroom were identified: (1) location, (2) structure and sequence, (3) duration, (4) participants, (5) acceptable student behavior, (6) instructional moves, and (7) content and materials. To make a decision about each of these components for every activity during a given day or week would be an imposing task. The way Mrs. Lisa was able to manage the large number of activities used in her classroom was by routinizing as many of the components of an activity as possible.

All activities in Mrs. Lisa's classroom were routinized to some degree. Mrs. Lisa said that much of the classroom time in the fall was devoted to teaching students the structure and sequence of

activities and acceptable student behavior in each setting. Location and participants for activities were easily learned and often were changed. Components such as duration, content and materials, and instructional moves were the teacher's responsibility, and the success of an activity was not dependent on the student's awareness or understanding of these features.

By the beginning of winter term when this study began, most of the activities in Mrs. Lisa's classroom were well routinized--so much so that, for most reading, math, and writing skills activities, Mrs. Lisa's planning and interactive decision making dealt primarily with content and materials. The other components of the activities were established and understood by both the teacher and the students, and little or no time was spent dealing with them during planning or teaching.

An example of a well routinized activity is handwriting. On Tuesday, Wednesday, and Thursday mornings from approximately 9:15 to 9:30 during winter term, handwriting took place. This was a large group activity done at the students' seats using the handwriting workbook. The following descriptions of two handwriting lessons done almost two months apart illustrate the degree to which the sequence and structure, the duration, acceptable student behavior, and the teacher's instructional moves were part of an established routine.

2/2/77 9:15 Mrs. Lisa goes to the platform, calls the kids' names and hands out the handwriting books. Ed begins to talk and Mrs. Lisa tells him to "zip it up." The kids go back to their seats. Several kids are shss-ing each other, and Mrs. Lisa says to the whole class, "Let's see if you can get to your seats, quiet for a change." She tells them that they're on page fourteen in their workbook and then walks to the front of the class.

She tells them to put their initials on the top of the page and the date 2/2. She then walks over and opens two windows at the front of the class. Mrs. Lisa asks questions about the animals in the pictures in their workbook. She asks the class to read the sentence on the page. Then she explains how to do the exercises. She lines the blackboard and then writes the sentence on the board. The kids copy it into their workbooks. She writes, "We saw a walrus," and reminds them to put a comma, not a period, since they're going to write something else. She goes on to write "a kangaroo, a fox, and a zebra." She then walks to the window and pulls down the shades on the windows that she'd opened, so that the air is not blowing straight into the room.

9:23 She tells them to put their initials and the date on the next page. Sandy (the aide) enters the room. Mrs. Lisa walks to the back of the room and tells the kids to trace the letters and then to write one of their own. She gets the reading folders to Sandy and explains what she's doing with them today. Mrs. Lisa then walks back to the front of the class. She tells the kids that there are two questions that they're going to have to answer on this page. She calls on Tom to read the first question. Then she asks the kids to answer it. The kids give four correct answers (four animals) and Mrs. Lisa tells them to choose two. (In looking over these on Monday, she said that there wasn't room to write all four of them.) She calls on Dona to read the second question, and then calls on various kids to answer it. She then tells them to write three things on the line and only two if they cannot fit three.

9:28 Sandy sits down on the platform and glances through the folders that Mrs. Lisa had given her. Mrs. Lisa tells the kids that when they're finished, she will pick up their folders.

3/29/77 9:04 The kids finish and Mrs. Lisa asks Suzie to come up to the platform. She comes up to the platform and shows a picture about how the hatchery at State University is using solar heating to heat it. Mrs. Lisa skims through the article and elaborates on Suzie's explanation. Mrs. Lisa then calls the kids' names and as they come up, she passes out the handwriting books and tells the kids they can turn to page thirty-eight. The kids return to their seats and begin opening their books. Mrs. Lisa finished and heads to the front of the room.

Mrs. Lisa sees some workbook pages on the floor and asks the kids to check their books to see if they have page sixty-one. Someone seems to have lost a whole section. After about three seconds, Andy says that it's his, and Mrs. Lisa gives it to him. Mrs. Lisa goes up and lines the front blackboard. Lois says that she doesn't have that page. Mrs. Lisa goes over and looks at it and says that it was probably in the work that she sent with her last week when she was gone. She goes back to the book case and tears the page from one of the other workbooks and gives it to her. She then goes up to the front board. The lesson that they're doing today asks for rhyming words and as the kids say them, Mrs. Lisa writes them on the board. The kids write two or three in the space provided in the workbook. After seventeen rhyming words for the first one (day), Mrs. Lisa says she's going to stop there and says that the kids have quite a choice. She then goes to the next word (sun) and the kids raise their hands to give her these. She writes down six of them, and then goes on to the next word. She tells them that she would like for them to write at least three of the words on the board for each word in the book. For the next word (tree) the kids list twelve words. She tells them that they may only be able to get two words rhyming with the fourth word on their lines since this word is longer (light). The kids generate twelve to rhyme with this word and also twelve to rhyme with the last word (lake).

9:20 When done, Mrs. Lisa tells the kids to choose the ones they want and then they'll write a rhyme on the next page. She tells the kids to copy the first part of the rhyme on page thirty-nine and then they can finish it on their own. She writes it up on the board and then writes some words that rhyme with the last word in the phrase (cat). Mrs. Lisa tells the kids that the last word in their sentences has to end with <u>at</u>. She then gets a pad and pencil off her desk and tells the kids that she'll help them if they need help with their spelling. Mrs. Lisa tells the kids that if they're finished, to hand their books to Suzie (who just said that she's finished). Mrs. Lisa tells the kids that she'll be interested to read these to see what they come up with for their endings. As the kids finish, Suzie and Dona pick up the books.

The extent to which other activities were routinized in Mrs. Lisa's classroom is illustrated in Table 5.6. This table indicates

Table 5.6

Routinization of activities in the weekly schedule for winter term.

	Location	Structure	Duration	Participants	Student Behavior	Instructional Moves	Content & Materials	Total number of fixed features
Library	+	+	+	+	+	+	+	7
Phonics Workbooks	+	+	+	+	+	+		6
Reading Folders	+	+	+	+	+	+		6
Reading Groups	+	+	+	+	+	+		6
Reading Lab	+	+	+	+	+	+	+	7
Story Reading	+	+	+	+	+	+	+	7
U.S.S.R.	+	+	+	+	+	+	+	7
Math Games	+	+	+	+	+	+	+	7
Math Quizes	+	+	+	+	+	+	+	7
** Math Unit			+	+	+			3
Math Workbooks	+	+	+	+	+	+		6
Calendars	+	+	+	+	+	+	+	7
Creative Writing	+		+	+	+	+		5
Decoding	+	+	+	+	+	+	+	7
Find Mistakes	+	+	+	+	+	+	+	7
Handwriting Workbooks	+	+	+	+	+	+		6
Letter Writing	+	+	+	+	+	+	+	7
Mindbender	+	+	+	+	+	+	+	7
Orange Suitcase	+	+	+	+	+	+		6
Pencil Pals	+	+	+	+	+	+	+	7
Spelling Bee	+	+	+	+	+	+	+	7
Spelling Folders	+	+	+	+	+	+	+	7
Spelling Test	+	+	+	+	+	+	+	7
Word Contest	+	+	+	+	+	+	+	7
Snoopy Books	+	+	+	+	+	+	+	7
Snoopy Snews	+	+	+	+	+	+	+	7
** Social Studies			+	+				2
Weekly Reader	+	+	+	+	+	+	+	7
** Science			+	+				2
Art in Room	+		+	+	+	+		5
Block Pattern	+	+	+	+	+	+	+	7
Change Jobs	+	+	+	+	+	+	+	7
Choice Time	+	+	+	+	+	+	+	7
**Cooking			+	+				2
**Field Trip	+		+	+				3
Pass out Papers	+	+	+	+	+	+	+	7
Station Work	+	+	+	+	+	+		6
Total Blanks	4	7	0	0	4	5	14	

+ - indicates features of activities that are routinized or "set" once the weekly schedule is established.

** - activities designated as non-routine

for each activity the number of features that were routinized or "set" once the weekly schedule was established. Activities with three or fewer set features are designed as non-routine activities. These include math unit activities, social studies unit activities, science unit activities, cooking, and field trips. For routinized activities whose features were not completely "set" (a score of seven in Table 5.6), the most common pattern was for the content and materials to be left open (the sixteen activities scored six) or for content and materials and structure of the activity to be left open (the two activities scored five). What these patterns indicate is that for routinized activities requiring weekly or daily planning, Mrs. Lisa usually only had to deal with the content of the lesson and any materials that the students might need. In cases in which texts or workbooks were used, planning decisions might involve the selection of pages that would be covered during an activity.

Routinization or lack of routinization of an activity was most visible during the set-up phase of an activity. An increase in the number of teacher and student behaviors in this phase reflected the novelty or lack of routinization of an activity. Table 5.6 shows that at a minimum, the duration of an activity and the participants (grouping) were established in all activities. Since as many as five features of non-routined activities were not known to the students beforehand, more time had to be spent specifying and explaing such things as location, structure, acceptable student behaviors, and the content and materials to be used. Non-routine activities, as a result, took longer for Mrs. Lisa to set up. The lesson phase of an activity reflected less of the routinization of the activity and more of its

complexity. However, there was some shrinkage in the lesson phase as the activity became more routinized. This was due to the fact that Mrs. Lisa often had to repeat instructions during the lesson, carrying some functions of the set-up phase into the lesson phase. As an activity was better understood by the students, fewer reminders about its special features were needed after the set-up phase.

Figure 5.8 illustrates the effects of routinization and complexity on the structure and duration of an activity. Complex activities are characterized by longer and more elaborate lesson phases while routine activities are characterized by their shorter set-up phase. The way in which Mrs. Lisa's activities fall into the four categories created by Figure 5.8 is presented in Figure 5.9. Of the four types of activities illustrated, a majority of Mrs. Lisa's activities fall into the simple/routine category (category two). Twenty-six or 70% of the activities fall into this category. The remaining 30% of the activities fall into categories three (complex/non-routine) and four (complex/routine). By winter term, no activities could be classified as simple/non-routine.

One way to account for the empty cell in Figure 5.9 is to hypothesize a basic goal in Mrs. Lisa's planning of striving to reduce demands on her planning, and teaching by routinization as much of her teaching as possible. This would mean that at the beginning of the year, all of her activities fell into categories one and three, and, as the schedule became established, most activities moved into categories two and four. All simple activities were easily routinized and so were many complex activities. However, by winter term, there remained a group of complex activities that was still not routinized

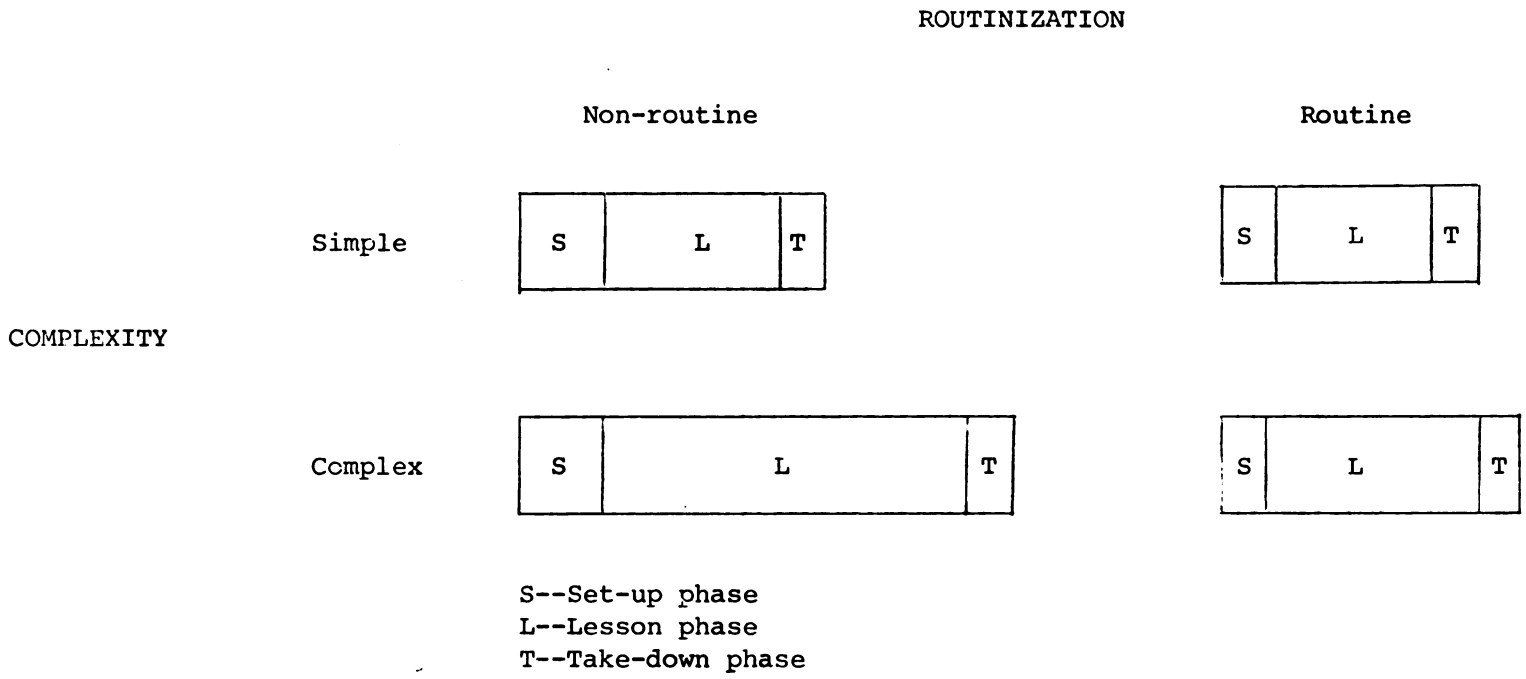


Figure 5.8 Effects of complexity and routinization on the structure and duration of an activity

1. Simple / Non-routine	2. Simple / Routine
No activities	Rest of activities coded in Table 6 (70% of total)
3. Complex / Non-routine	**4. Complex / Routine**
Science unit activities Social studies unit activities Math unit activities Cooking Field trips (14% of total)	Library Reading lab Math games Creative writing Decoding Pencil pals (16% of total)

Figure 5.9 Distribution of Mrs. Lisa's activities on dimensions of complexity and routinization

(category three). The presence of cooking and field trips in this category are easy to explain. Each cooking activity and field trip is different, and these activities happen so rarely that there is no need or easy way to routinize them. Thus, low frequency coupled with high complexity seemed to keep these activities out of category four.

The presence of science, social studies, and math unit activities is more difficult to explain. Figure 5.2 shows that these activities were regularly occurring scheduled activities with science and social studies activities each averaging a little over one occurrence a week and math unit activities occurring a little over two times a week. Although science and social studies were of a lower priority in Mrs. Lisa's teaching, math was high on her list.

One factor that these three activities have in common is that they are all taught in units. All of these activities could have been routinized, but Mrs. Lisa chose to teach them using a unit format. This decision committed her to more planning for these areas during winter and spring terms. When asked why science, social studies and math were taught in this format, Mrs. Lisa gave the following rationale. She said that the unit format was basically in response to the dilemma posed by having objectives set by the district and not having published, prepared materials that would meet these objectives. Chapter IV discussed the materials used in science, social studies, and math, and though there were kits and materials available, there were gaps in the materials. Also, most of the science and social studies objectives were quickly met in the fall and the first part of winter term. What this amounted to was that by the middle of winter term, Mrs. Lisa was planning for and teaching units in math, social studies, and science

that (1) she thought the students especially needed to know, (2) she thought the students were especially interested in, and (3) she enjoyed teaching. This commitment to the importance or interest of these lessons were the basic reasons for Mrs. Lisa's willingness to invest more time in planning for these areas.

To sum up, by winter term most of Mrs. Lisa's activities (86%) were routinized and required little planning and little time in set-up and management when being taught. Most of Mrs. Lisa's planning time during winter and spring terms was taken up by planning for activites that were not routinized. This was primarily planning for science, social studies, and math units. In planning activities for these units, Mrs. Lisa had to make decisons about most activity components. The only fairly standard components were participants and duration. Science, social studies, and math unit activities were not routinized because of the lack of prepared materials that would meet all of the objectives and because of Mrs. Lisa's willingness to spend extra time preparing units of special importance or of special interest to her and the students.

Instructional routines. Instructional routines are methods and procedures established by the teacher to carry out specific instructional moves. These routines are in effect strategies or styles of teaching that over time have been developed and occur in regular configurations and sequences. In the first part of this chapter, teacher-role was offered as a meaningful unit in which to characterize teacher behavior. Within each role, there are several different behaviors (moves.) It makes sense to hypothesize that there is a finite number and variety of moves for any one teacher. Further, it is likely that

to simplify planning and preparation, successful behaviors or moves are repeated within many different activities or roles. Thus, teacher-roles can be portrayed as collections of teaching moves emphasizing some moves over others. Given these basic conceptions, instructional routines can be characterized as patterns of moves for carrying out teacher-roles that are routinely employed in conjunction with specific instructional activities.

Since instruction took place mainly within activities in Mrs. Lisa's classroom, instructional routines were established components of activity routines. Mrs. Lisa had a large repertoire of instructional moves such as giving instructions, demonstrating, instructing, monitoring, reviewing, and questioning that were established and rarely modified. Thus, as the activity was routinized, the teacher's moves and roles were routinized as well.

Many of Mrs. Lisa's instructional routines were used within different activities. This was most common across activities that were similar. For instance, Mrs. Lisa used the same monitoring routine for large group activities such as handwriting books, spelling folders, and Snoopy books where the students were often copying something off the blackboard onto their papers. After Mrs. Lisa had written a sentence or two on the board, she would walk around the classroom for a minute or so and glance at the students' papers. As another example, Mrs. Lisa's method for giving isntructions differed with group size. In large groups, instructions were usually given two or three times and often one of the students was asked to repeat them. In small groups, instructions were generally given only once, and Mrs. Lisa

relied on watching each student's work to determine whether the instructions had been understood.

Decisions about instructional moves were rarely mentioned by Mrs. Lisa, usually only when an activity was not going well. When planning for a new activity, most of Mrs. Lisa's attention was directed towards the instructional task itself rather than how it would be taught. When new activities were implemented, few new or unusual instructional moves were apparent. Based on these two observations, it seems that Mrs. Lisa's instructional moves were highly routinized and were performed as an established response to a specific type of instructional task. For instance, when Mrs. Lisa planned the origami (Japanese paper folding) activity for her social studies unit, there was only some basic deliberation about her instructional strategy (e.g., demonstrate, then do several figures as a class), and the specific moves of instructing, demonstrating, monitoring, and evaluating were routinely carried out as part of the instructor-demonstrator role.

Management routines. Management routines are established procedures for controlling and coordinating classroom organization and behavior not associated with specific activities. In Mrs. Lisa's classroom, management routines controlled and coordinated such things as transition between activities, passing out or collecting materials, leaving the room, cleaning up the room, and starting school in the morning or after lunch. Management routines include two major components: procedures and participants. Procedures specify what is to be accomplished, the steps and sequence in which it is to be done, and in some cases, the time and location at which it is to be carried out. Since most management routines did not involve the whole class,

individuals or groups of individuals were specified as participants to carry out the routine.

The most prominent framework for management routines in Mrs. Lisa's classroom was the assignment of jobs to the students. As discussed in the last chapter, each week every student was responsible for a job involving some management aspect of the classroom. These ranged from clean-up jobs such as erasing the board or putting up the chairs on the small group tables to helping jobs such as taking the attendance slip to the office or helping collect and pass out materials. By the time of this study, nearly every student knew what each job entailed and could carry it out with little guidance from Mrs. Lisa. However, Mrs. Lisa said that much of fall term was spent getting the students to this point. Some jobs were only done at set times during the day, but others were carried out as needed.

This routinization of basic management needs freed Mrs. Lisa from having to do many things herself and from having to stop and explain to a student the procedure for doing a job. The management structure set up by the job system enabled Mrs. Lisa to set in motion rather complex behavior sequences often by only the mention of several words. This not only simplified the teaching task for Mrs. Lisa, but also contributed to the smooth functioning of the classroom as a learning setting.

The routine established for leaving the room is a good example of a management routine in Mrs. Lisa's classroom. This was frequently used since it was set into motion whenever the class was leaving the room to go to another room in the building, to go to recess or lunch, or to go home after shcool. To avoid the talking, shoving, and

pushing that she usually had to contend with when the students lined up to leave the room, Mrs. Lisa developed the following procedure. Each week two students chose or were assigned to the jobs of Line Leader and Excuser (more commonly referred to as Tapper). When the class was to leave the room, rather than asking them to line up at the door, Mrs. Lisa would first say "Line Leader" and then several seconds later "Tapper." These two words set the routine in motion. The Line Leader was the first person who could leave the room, and in rare instances when the class did line up (for example, on field trips), the Line Leader was first in line. After the Line Leader had begun to leave the room, the Tapper began his or her job. This involved walking to each of the students and tapping each on the head when he or she appeared to be ready. The effect of this was that the students filtered out of the room one at a time or in groups of two or three rather than as a large group. Both the Line Leader and Tapper were popular jobs, and the students enjoyed being excused in this manner. More important, this procedure accomplished Mrs. Lisa's purpose without the additional demands brought on by having to monitor the students in a line.

Not all management routines involved the students' jobs. Mrs. Lisa established many routines not assigned to specific students that minimized the work she had to do in both the preactive and interactive setting. To simplify her grading procedures, for instance, students were required to turn their work in to their "work-done" files that Mrs. Lisa kept near her table. As a result of this system, Mrs. Lisa had all of the completed assignments in one place and could quickly check to see if everyone had turned in his or her work.

A practice that simplified planning and grading involved the book file cabinet where student texts and workbooks were kept. By having students get and return books to this rack, she did not have to walk around the room to obtain or return student books. When she needed to look through a particular book for planning purposes, it was quickly and easily accessible; and when workbooks had to be returned to the students, she did not have to carry them around the room and distribute them to the desks.

Two examples of routines that simplified Mrs. Lisa's job in the interactive setting are the choice time board and the rug. The choice time board was a bulletin board near the rug that listed the activities that were available to the students during choice time. Mrs. Lisa used this board to regulate the number of students doing each activity by putting up nails on which students were required to put their name tags. If all the nails were occupied, a student had to choose something else. This procedure minimized the problems associated with having too many students doing one activity; and with a glance at the board, Mrs. Lisa could quickly determine which students were involved in the various activities.

The rug was another management routine that controlled and coordinated activity. It was established at the beginning of the year that in the morning and after lunch, school would begin on the rug. By the time of this study, students automatically went over to the rug to begin class. In this manner, the rug provided an informal and regular focus for introducing activities such as calling roll and going over the schedule. The rug also served as a "staging" area for leaving the room. When going outside, Mrs. Lisa would excuse the students

several minutes early to go to their lockers. When they had gotten their coats, they were to come back into the room and wait on the rug until the bell rang. This minimized wandering around the room, and the students were together for any last minute reminders or announcements.

There were many other management routines that operated smoothly and regularly in Mrs. Lisa's classroom. These examples illustrate how management routines function as the glue that holds together and coordinates students' behavior outside of activities, and, as such, reduces the demands on the teacher in both the preactive and interactive teaching settings.

Executive planning routines. Executive planning routines are a system of established thought patterns set off by specific planning tasks and results from experience in numerous similar situations. These routines occur within the teacher's head and function to control and coordinate planning. In other words, executive planning routines serve as meta-routines for managing the sequencing and organizing of other routines.

Executive planning routines function in a similar way to executive control structures in models of learning (Lindsay and Norman, 1972; Gagné, 1974). They activate and guide planning processes in the same way that cognitive strategies activate and guide learning in Gagné's (1970) model of learning. Executive planning routines help the planner deal with certain planning tasks by helping to manage the process of planning. The soundness and originality of planning may be determined to a great extent by the efficiency and appropriateness of executive planning routines.

These routines became visible as Mrs. Lisa repeatedly approached different planning tasks in consistent and regular ways. The routine for weekly planning was different from the routine for daily or unit planning, although each week this planning was carried out according to an established procedure. Further description of these routines and the decision processes that they involve is undertaken in Chapters VI and VIII.

Teaching Routines and Planning

Thus far in this chapter, the prominance of activities and routines in Mrs. Lisa's teaching has been discussed. It was proposed that Mrs. Lisa's planning chiefly involved decision making about the selection, organization, and sequencing of routines. The results of using such a planning strategy will be discussed in this section.

It is proposed here that when used properly, routines increase teacher flexibility and effectiveness by freeing the teacher's time and energy from many planning and implementation decisions. The complexity and unpredictability that characterize the teaching environment impose many demands on the teacher, and it becomes necessary to find methods to decrease the amount of information to be processed at any one time. One method to cope with these demands is by developing routines. The routinization of action fixes certain aspects of behavior and thus reduces the number of characteristics that must be evaluated, decided upon, and manipulated. Since most planning must necessarily take place on the teacher's time--before and after school and in the evenings or on weekends--and since planning competes with other activities for this time, the use of routines reduces the time

and energy expended for planning, thus freeing time and energy for other activites.

The degree to which a routine can reduce the demands on planning can be illustrated by a general routine called textbook teaching. Textbook teaching has been discussed by Smith and Geoffrey (1968) and by Hudgins (1971) and refers to the practice of relying heavily on a text or similar material to provide content and method. By following closely a textbook and teachers' manual, a teacher might also rely on the materials to dictate the structure, sequence, and duration of the lesson. Coupled with some well tested management routines, textbook teaching could virtually eliminate the need for preactive planning in some classrooms.

Smith and Geoffrey present several advantages of this type of teaching. It eases the preparation required of the teacher since the materials are on hand and spelled out. Furthermore, it provides procedural clarity for the students and a firm focus on where one is at all times. However, in his analysis of textbook teaching, Hudgins warns of three possible consequences of using this routine. First, the teacher's role becomes mainly that of a processor of information contained in the materials themselves, thus reducing the opportunities for significant innovations or modifications of traditional approaches to instruction. Second, textbook teaching tends to result in day-to-day perspectives regarding the goals of instruction. Third, this approach to teaching subordinates the autonomy, initiative, and judgment of the teacher to that of the textbook authors. Though textbook teaching has many potential pitfalls, it serves as an example of how a teaching routine can greatly reduce the need for planning.

Textbook teaching as described above was not a part of Mrs. Lisa's teaching, although activity routines did reduce demands on teaching in similar ways. As discussed earlier, content was not the focus of her routinization, but rather such things as participants, sequence, duration, and acceptable student behavior. Because of the routinization of activities, more time was available for deciding on content and for developing creative ways to present it. Routinization of activities also freed time for diagnosing and prescribing for individual needs, and by winter term, much preactive teaching time was involved in keeping track of individual progress in math and reading. Since the activities themselves were well routinized, Mrs. Lisa was able to devote more time and energy to evaluating individual student performance.

To summarize, Mrs. Lisa used routines as a tool to increase the flexibility and effectiveness of her teaching. Rather than becoming bound and restricted by established ways of doing things, routines allowed her to spend more time developing creative materials and activities that increased the interest and involvement of the students. In the same manner, routines made possible adequate time for quickly evaluating student work and for maintaining a focus on individual effort.

Teaching Routines and Interactive Teaching

Teaching routines are not only an efficient and effective way to manage preactive teaching, but they increase teacher flexibility and effectiveness in the interactive setting as well. One way they

accomplish this is by functioning as stable sub-assemblies of classroom organization.

When talking about evolution of complex systems, Simon (1969) relates the following parable:

> There once were two watchmakers, named Hora and Tempus, who manufactured very fine watches. Both of them were highly regarded, and the phones in their workshops rang frequently--new customers were constantly calling them. However, Hora prospered, while Tempus became poorer and poorer and finally lost his shop. What was the reason?
>
> The watches the men made consisted of about 1,000 parts each. Tempus had so constructed his that if he had one partly assembled and had to put it down--to answer the phone, say--it immediately fell to pieces and had to be reassembled from the elements. The better the customers liked his watches, the more they phoned him and the more difficult it became for him to find enough uninterrupted time to finish a watch.
>
> The watches that Hora made were no less complex than those of Tempus. But he had designed them so that he could put together subassemblies of about ten elements each. Ten of these subassemblies, again, could be put together into a larger subassembly; and a system of ten of the latter subassemblies constituted the whole watch. Hence, when Hora had to put down a partly assembled watch in order to answer the phone, he lost only small parts of his work, and he assembled his watches in only a fraction of the man-hours it took Tempus (pp. 90-91).

This parable illustrates the importance of stable subassemblies in complex systems, especially those prone to interruption. If a complex procedure is interrupted, the system will usually break down into its most stable subsystem. If that subsystem is small, then much time and effort may be expanded to regain the lost ground; but if that subsystem is larger, less time and effort is required.

Interruptions are common in most classrooms and are constant challenges to the stability of the social and organizational structure of the classroom and the teacher's ability to control the classroom. Interruptions are caused by messengers, other teachers, announcements over the intercom, fire drills, mishaps in the classroom, and by

innumerable other intrusions. After an interruption, there is the potential for much lost time while the teacher returns to his or her task to direct the students back to theirs.

In Mrs. Lisa's classroom, little time was lost due to interruptions. This was largely due to the stability of activity routines as subassemblies of classroom organization. After an interruption was over, both Mrs. Lisa and the students were able to pick up the activity where it had terminated because of their knowledge about the structure and sequence of the activity. They had a sufficient overview of the procedure for the whole activity, and they not only knew what had been done, but also knew what was to come. The routines were so well known that Mrs. Lisa once remarked that the last time a substitute took the class, the students told the substitute what they were supposed to do next.

Another function of routines in the interactive setting is that of increasing the predictability and reducing the complexity of the classroom environment for the students. By knowing the schedule of activities for morning or afternoon, students had a good idea of what they would be doing for the next few hours. Routines also allowed the students to predict what would be expected of them as participants in an activity. Routines provided an order and stability to the classroom that reduced the demands on the students to figure out what they were supposed to be doing and how they were supposed to do it. The result of this was more time spent on content and less time spent on procedure. Another way of stating is is that more time was spent on task and less time was spent in set-up and management.

A major result of the stability and predictability that routines brought to the classroom was freedom and flexibility for Mrs. Lisa.

Since most activities were stable and predictable, she was able to make impromptu changes or deviations to topics of interest to the students without destroying the orderly function of the activity. Different groups could be assigned to aides or parent volunteers, more time could be spent with individuals as problems arose, and new teaching methods could be explored within the context of otherwise stable activities. Many routinized activities no longer required continuous monitoring or supervision and Mrs. Lisa could use the time for giving feedback to individual students or could run more than one activity at once. In short, the less time that was tied up in management, supervision, or monitoring of the group, the more time Mrs. Lisa could devote to individualized attention or instruction.

Chapter Summary

In this chapter, activities and routines were presented as two central aspects of Mrs. Lisa's planning and instruction. Activities were first discussed as basic structural units of planning and action in Mrs. Lisa's classroom. The role activities played as controlled behavior settings was discussed next, including the way future task environments were shaped to conform with the teacher's perceptions and purposes. Seven features of instructional activities were discussed that were presented as foci for teacher decision making and planning.

The second half of the chapter was devoted to teaching routines. It was proposed that for Mrs. Lisa, planning chiefly involved the selection, organization, and sequencing of routines. Activity routines, instructional routines, management routines, and executive planning routines were each described and illustrated, and the function of

routines as means for increasing teacher flexibility and effectiveness in planning and instruction was discussed.

CHAPTER VI

A STRUCTURAL MODEL OF PREACTIVE PLANNING

The purpose of this chapter is to present a structural description of Mrs. Lisa's preactive planning. This description is "structural" to the extent that it attempts to discern the arrangement of basic elements underlying Mrs. Lisa's preactive planning. The chapter will focus on a model depicting five different levels of planning, corresponding to five different time periods for which planning is conducted. Planning at each level will be discussed in terms of four descriptive aspects of planning: (1) planning goals, (2) information sources, (3) form of the plan, and (4) criteria for judging the plan's effectiveness. Finally, the connections and interactions between planning levels will be described.

This chapter adds another important piece to the description of Mrs. Lisa's planning. Chapter IV described the environment in which planning and teaching took place. Chapter V discussed activities and routines as the basic units or elements of her planning. This chapter will undertake a description of the structure of Mrs. Lisa's planning.

Overview of the Model

Rationale

It is assumed that planning is a rational, that is, an orderly, intelligible activity, and, as such, that it can be described and understood. The focus of this study was on describing the decision

processes that are regular features of Mrs. Lisa's planning. As the study progressed, it became apparent that Mrs. Lisa's planning had significant structural as well as process characteristics.

The nature of the teaching task requires planning in a variety of forms and circumstances. The complexity of teaching requires that some organizing and sequencing take place ahead of time. The unpredictability of the task makes the elaboration and revision of plans over time a necessary and unavoidable job. To accomodate these demands, Mrs. Lisa uses several different types of planning.

The identification and description of these different types of planning are important for several reasons. First, by identifying different types of planning and how they interact, it may be possible to identify strategic research sites for further and more detailed study. This may allow future research to be more efficient and productive by specifying times during teaching when certain types of planning most consequential for educational programs are likely to be observed.

Second, a structural analysis of planning may provide insight into decision processes in planning. It is likely that the way in which planning decisions are made reflects the configurations and relationships of different planning types. Demands imposed by the structure of planning may also be exposed in this type of analysis. One possible structural problem created by different types of planning is the coordination of planning activity across levels or types of planning.

A third reason a structural analysis of planning is important is that if different levels of planning can be identified, the nature of planning should be different at each level. If this is true, then it

may have important implications for teacher training. If planning is no longer characterized as a unitary skill or as a set of skills for a specific purpose or setting, then it is possible that teachers may be poor planners at one level but not another, or may even ignore one type of planning. Awareness of the different tasks that make up the total planning activity may increase the efficiency and productivity of teacher planning.

Levels of Planning

Five basic types of planning activity were identified in Mrs. Lisa's work. Because of their hierarchical organization and focus on different spans of classroom activity, they are referred to as levels of planning. The five planning levels portrayed in the model are (1) yearly planning, (2) term planning, (3) unit planning, (4) weekly planning, and (5) daily planning. Although planning may occur in the interactive teaching setting, it was not a focus of this study and is not a part of the model.[10] Figure 6.1 illustrates the five basic levels of the model plus two other levels--institutional planning and planning for next year--which interact with preactive planning and which will be mentioned briefly.

---

[10]Planning has been defined in this study as a process of preparing a framework for guiding future action. The focus of this study has been on the preparation of this framework prior to teaching when the students are not in the classroom. It is reasonable to assume that this framework can is often modified as a result of things that take place once the students are in class. Thus, "interactive planning" most likely involves revision of plans rather than planning *de novo*.

The study of interactive planning is also complicated by methodological problems. These problems are common to the study of any interactive teaching decision and involve such issues as the consciousness of the decision, its observation, the inconvenience to the teacher of reporting the decision as it occurs, and so forth. For these reasons,

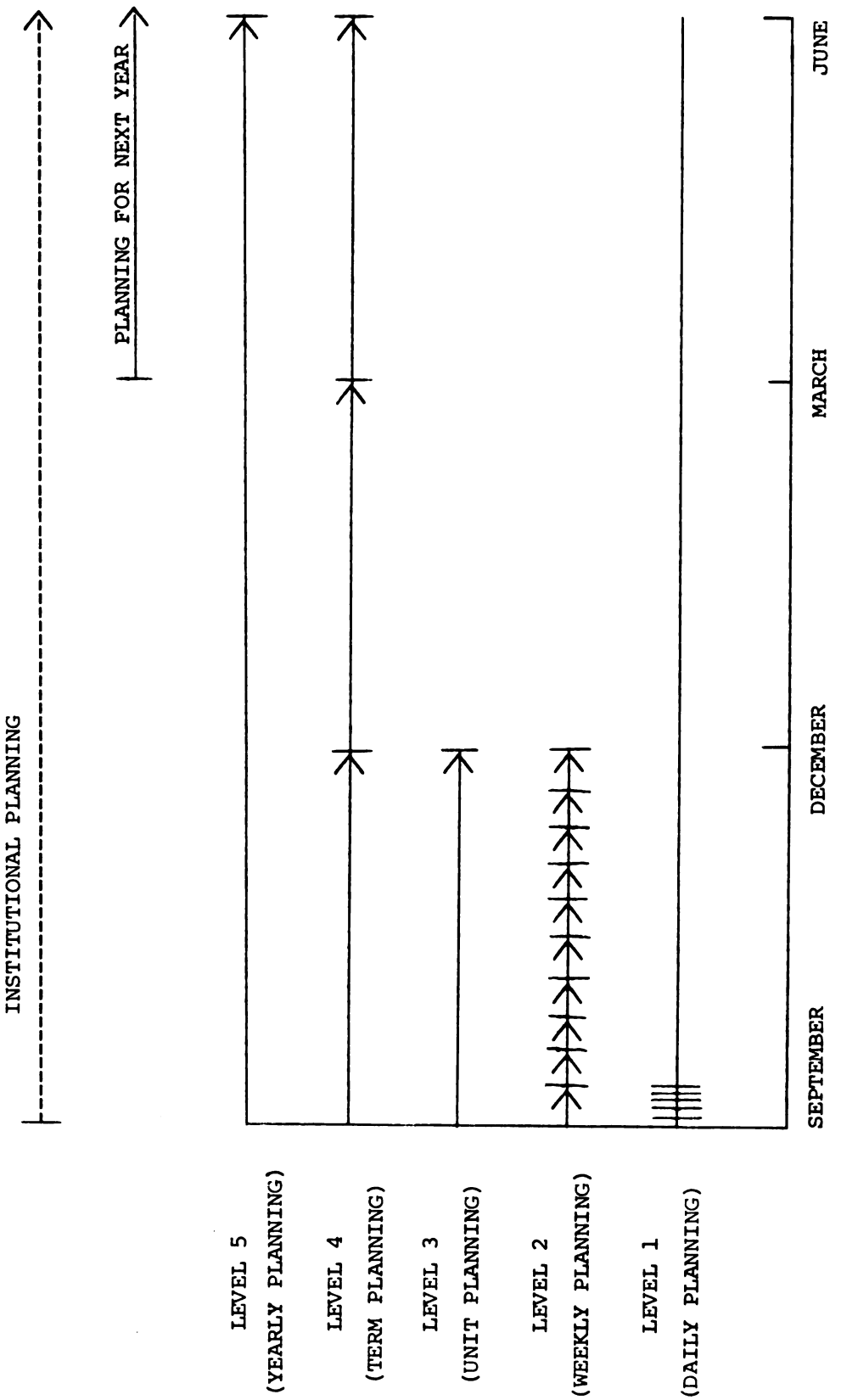


Figure 6.1 A structural model of preactive planning.

As mentioned above, each level in the model has as its focus a different scope or span of activity. Yearly planning is concerned with general materials, pupil placement, and sequencing and organizing teaching for the whole school year. Term planning centers on activities that will occur within the twelve weeks before the next vacation. Unit planning refers to the planning involved in developing an instructional unit for a specific subject matter. This unit will take place over a period of several weeks within a term. Weekly planning focuses on activity that will occur as part of the schedule on Monday through Friday, while daily planning involves the last minute modifications or preparations to be made during the day or before school starts the next day.

Four of the five levels of planning in this model were directly observed during this study. Since this research was conducted during the winter and spring terms, there was no opportunity to observe planning at the beginning of the school year. Information on this type of planning was obtained through interviews and through recall stimulated by using Mrs. Lisa's plan book to recreate her planning before school started and at the beginning of the year.

The basic structure of the model was developed through observation and interviews during the study. This was further corroborated by Mrs. Lisa's description of her own planning. Towards the end of the study, Mrs. Lisa was asked to list and characterize the types of planning she does. The following list and description of planning types was generated without any knowledge of the model being developed:

---

it was felt that preactive planning might initially be a more fruitful and less difficult area to study.

1. Long range--basic ideas for social studies, science units--some for math and reading--basic structure of what will be done but not specific time.

2. Term--planning on a term basis for social studies and science and for movies.

3. Monthly--deciding on basic units for social studies, science, and math. I decide on what I need librarian to get or what movies I need.

4. Weekly--use teacher's plan book--specific units and time element added--more detailed.

5. Daily--put schedule on board, getting actual materials out.

6. Immediate--on the spot planning--changes if needed, time fillers.

Descriptive Dimensions

To describe and differentiate planning at each of the five levels in the model, four dimensions of the planning process will be discussed. These include (1) planning goals, (2) information sources, (3) form of the plan, and (4) criteria for judging planning effectiveness. These dimensions have been adopted from a study of the planning process (Dror, 1963) aimed at identifying the main facets of planning in the areas of administration and policy science. Four primary facets of planning were identified by Dror: (1) the general environment of the planning process, (2) the subject matter of planning, (3) the planning unit, and (4) the form of the plan.

Dror's planning facets were designed to describe planning in an organizational framework (usually towards the top) and by groups of individuals. Since Mrs. Lisa's planning was done individually and with close contact with the "subject matter" of planning (materials, students), many of Dror's categories were inappropriate for a description

of her planning. For this reason, the most relevant aspects of Dror's taxonomy were selected and grouped into the four categories of goals, information sources, form of the plan, and judgment criteria.

The description of these four aspects of Mrs. Lisa's planning at each level is based on several data sources. For the most part, Mrs. Lisa's planning goals were obtained through discussion and interview and through observation of her on-going planning. Information about the sources of information used in her planning were obtained through observation and through the pupil and activity judgment tasks explained in Chapter III. The form of Mrs. Lisa's plans were observed during the study, and the description of her criteria for judging planning effectiveness was based on observation and interview as well as on the analysis of past plans.

To summarize, the structural model to be presented and discussed in this chapter represents Mrs. Lisa's preactive planning at five levels: yearly planning, term planning, unit planning, weekly planning, and daily planning. The planning at each level will be characterized by five descriptive dimensions of planning. First, Mrs. Lisa's goals for planning will be discussed. Second, the primary information sources used in planning will be described. Third, the discussion will attend to the form the plan takes; and finally, the criteria that Mrs. Lisa uses to judge the effectiveness of her planning will be described. The next five sections are devoted to discussing the five levels of activity observed in Mrs. Lisa's planning focusing on these four dimensions.

Level V - Yearly Planning

Yearly planning involves the development of plans whose scope is the whole school year. Mrs. Lisa does most of her yearly planning during the summer vacation and in the first few weeks of school. This planning is done mainly at home, but since Mrs. Lisa tutors students in her own classroom for about half the summer, she does have easy access to all of her resource materials and does some of her planning there.

Planning Goals

Mrs. Lisa's major goals in yearly planning are to establish the general content of her instruction for the school year and to outline the basic sequence in which the content will be presented. Establishing the content involves generating ideas for activities and coordinating them with the district performance objectives and the materials and resources potentially available for teaching.

At this point in her planning, Mrs. Lisa's academic goals are fairly general and are framed by the district objectives. (These objectives were briefly discussed in Chapter IV and are outlined in Appendix C.) In Mrs. Lisa's words, "Objectives are a framework for teachers to feel their way through teaching." For nearly all subject matter areas, she tries to teach so that as many objectives as possible are met. Mrs. Lisa tries to hit all the objectives in science and social studies. She used the parent conference form objectives rather than the more detailed statements in the objectives handbook. Quite a bit of effort was spent in the summer combining the objectives in these areas for both grades and then deciding which objectives should be covered without repeating too much or covering the second-third

grade teachers' materials. In writing skills, Mrs. Lisa feels that many of the objectives are too difficult for her age level and cannot possibly be mastered. Because of this, she is more concerned with introducing topics than pressing for mastery. Mrs. Lisa uses the reading objectives only to "give her a feeling" where the students should be by the end of the year. Overall, Mrs. Lisa's teaching is not strictly guided by the district objectives, but she does want to be in a position where she can say that she is teaching the content specified for students at those grade levels. As a result, the district objectives act as a "frame" for her planning.

Yearly planning is important for ordering or reserving certain instructional resources. This is especially true for films. The county has a media center that supplies films and other resources to all districts in the area. Reservations for films must be made in the late spring or early summer for the next year because of the amount of coordination involved in serving all of the schools. Mrs. Lisa uses many films in her social studies, science, and writing skills instruction. Thus, in order to coordinate the arrival of the films with her teaching, she must have a general notion of when specific units or lessons will occur during the year. Early sequencing also becomes important for reserving the kits for social studies that are shared by the schools in the district. A consequence of not ordering films early (and a pattern followed by some teachers at Byron School) is that films have to be used when they arrive for other teachers. This checking the film list and using what is in makes it hard to tie films into subject or unit being studied and was often used by some teachers to fill time. The consequence of not reserving social studies kits early was not

getting them when wanted and having to schedule units around the availability of specific kits.

The necessity for scheduling or ordering materials in the spring is not the sole motivator for yearly planning, but it is a major one. It is certainly the reason that Mrs. Lisa's yearly planning takes place so early. Without these restrictions, it is likely that yearly planning would be done later in the summer.

A major factor that seems to motivate Mrs. Lisa's yearly planning is her "need" to have an overview of the year to provide her with a picture of how both her instructional objectives and the district objectives will be covered during the school year. This overview provides a feeling for the overall balance and sequence of the year's instruction as well as pointing out times and instances where more specific planning will be needed.

Information Sources

There are four basic sources of information used by Mrs. Lisa in her planning. Three sources are external and one is internal. The external sources are pupils, materials and resources, and the teaching environment. The internal source is her teaching experience.

There are two major pieces of information about her students that Mrs. Lisa uses in her yearly planning. The first is the general number of first graders and the number of second graders she will have in the fall. She receives this number late in the spring and it affects her yearly planning in the following manner. If the count she receives shows that she has more students at one level than the other, she has a general idea about the general age, maturity, and academic level of

the majority of her students. Mrs. Lisa may then decide to spend more or less time on specific subject matter areas or units as she begins to anticipate the student interest and needs. This impression is modified, if need be, in the first few weeks of school, but beforehand it may influence her general selection and sequencing of instruction.

The second major piece of information about pupils that influences her yearly planning is the number of last year's first graders returning to her classroom as second graders. This affects her planning a great deal in areas such as science, social studies, and writing skills, since Mrs. Lisa does not want to repeat the same units or activities if a large number of her students participated in them the year before. This year Mrs. Lisa had eight first graders return, and next year she will have twelve. This repetition of students forces her to develop what amounts to a two-year curriculum in the subject-matter areas affected.

The major cue for Mrs. Lisa regarding materials and resources in her yearly planning is availability. When selecting and sequencing content, she is concerned whether materials such as kits, texts, workbooks and films are available that are related to the content to be taught. In considering availability, Mrs. Lisa considers how adequately materials meet her general goals for presenting the content, the durability and workmanship of the materials, and whether the number of texts or workbooks available is sufficient. Further aspects of materials to which Mrs. Lisa attends are difficulty, attractiveness, specific skills taught, and interest value for the students. In addition, she checks out whether the materials are consumable (not to be reused next year--so pages can be written on or torn out) and whether they contain some

type of recording or evaluation system. Many of these decisions are made late in the spring when materials such as workbooks, ditto masters, and texts are being ordered as well as during the summer when she considers the resources available in the classroom or in the school.

When planning for the year, Mrs. Lisa considers one primary source of information from the general teaching environment: the curriculum guidelines set by the district. As mentioned in Chapter IV, the district influences Mrs. Lisa's planning through setting performance objectives for each grade level and through the adoption of specific curriculum packages to be used in certain subject matter areas. The manner in which the performance objectives influence Mrs. Lisa's yearly planning was mentioned earlier when talking about yearly planning goals. These objectives serve basically as a framework for selecting content to be taught and rarely represent a more detailed influence even at lower levels. Programs adopted by the district in science, social studies, and spelling are major influences since they present the available content to be taught, and Mrs. Lisa must decide what and when specific activities or units are to be presented in the classroom.

The final major source of information Mrs. Lisa uses in her yearly planning is experience. Mrs. Lisa draws heavily on past experience both for selecting content and for sequencing. Knowledge about what content has proved to be influential or important in student learning affects her choices, and knowledge based on sequencing content in various ways in the past influences her decisions about the general sequence of instruction for the year. At this level of planning, experience becomes an important influence, since the students, one of the most important sources for modifying plans, are not yet present.

Meanwhile her knowledge based on teaching at the same grade level in the same school for several years provides the best estimate of what content and sequence will be appropriate for her new students.

Form of the Plan

At the yearly level, Mrs. Lisa's plans take the form of very general outlines and lists of content and activities for each subject matter area. For each major subject matter area--reading, math, science, social studies, and writing skills--a spiral notebook is used for planning. In each notebook, Mrs. Lisa lists the content she wants to cover during the year and then begins to outline on a weekly basis the content and activities she would like to use in her instruction. The detail of the outlines varies widely across subject matter areas; examples of these plans are in Appendix F.

Since much of the content and sequence of reading is dictated by readers and workbooks, Mrs. Lisa's early planning consisted solely of a list of possible reading activities such as reading lab, phonics books, book reports, and silent reading. In writing skills, Mrs. Lisa first listed the content to be covered for each grade level based on the district performance objectives. Next, she listed for the first thirty-three weeks, word sounds and parts of speech to be covered each week. The next page in the notebook consisted of a list of activity ideas such as "word of the week" ("Mindbender"), verbal directions, "code," "rhyming," and "make small words" (later named "word contest").

In science, Mrs. Lisa listed the general science objectives for first and second grades. She then recorded the lessons from both the first and second grade manuals that would cover these objectives.

After that, she entered activities for the first thirteen weeks and the units to be covered in winter and spring terms.

Mrs. Lisa's early social studies planning included a weekly list of mindbender words and topics to discuss when doing Snoopy books. Next, movies were listed and earmarked for certain months under the general topics of feelings, economics, cities, others, and countries. After that, lessons were laid out on a weekly basis including such activities as Duso, Snoopy books, states to be discussed as part of the United States unit, and other units such as nutrition, Japan, economics, and mapping. For winter and spring terms only, unit names were indicated every few weeks.

The math planning at this level took the form of listing the units to be undertaken on a monthly basis. Cuisennaire rods were used for math instruction from September to December. Topics to be covered were greater than-less than, grouping, addition, subtraction, missing addends, fractions, and patterns. For winter and spring terms, units were entered by month: January--time, February--metrics, March--graphing, April--money, and May--review. For each unit, several possible activities were listed. Also recorded were movies that might be appropriate in certain months.

Criteris for Judging Planning Effectiveness

At this level of planning, Mrs. Lisa's main criterion for judging planning effectiveness is the comprehensiveness of her resulting plans. This criterion is more structural than functional and involves her impression of the completeness of the overall "picture" of the year in each subject matter area. Comprehensiveness involves the degree to

which Mrs. Lisa's content or instruction covers the district objectives in each area as well as the extent to which the general sequence of content and activities is specified. This level of planning is intended to bring Mrs. Lisa to the point of having a general idea of what content she will be teaching in each month of the school year for each subject matter area. It also provides her with an idea of what special materials or resources she will need to arrange for or reserve early in the year. In short, Mrs. Lisa strives to have a general yet comprehensive idea of what content she will be teaching, the sequence in which it will be taught, and some ideas about activities that she may use to teach it.

Level IV - Term Planning

Term planning is the next level of planning Mrs. Lisa engages in after yearly planning. Based on Mrs. Lisa's self report, fall term planning did not really begin until the third week of school when she had a more complete picture of her students. The first week of school (just Thursday and Friday) was spent orienting students to the school and classroom by involving students in many different short activities such as art projects (e.g., making locker decorations), story reading, movies, and doing some simple handwriting dittos. During these activities, Mrs. Lisa began observing and trying to determine student abilities on basic skills such as following directions, working as a group, physical coordination, drawing, cutting, and so forth. She was also trying to identify students with certain fears and the pupils' general ability to make decisions for themselves. The second week of school continued this general assessment, but Mrs. Lisa began testing

the students in more detail. On Monday, Tuesday, and Wednesday mornings, Mrs. Lisa tested the students using testing packets she had developed herself. On Monday, she tested the students on handwriting (capitals and lower case letters), knowledge of beginning and ending word sounds and sight word knowledge (using Dolch words). On Tuesday mornings, she tested general reading abilities, more handwriting, perception and eye-hand coordination, and basic math skills (simple addition and subtraction, missing addends, time, money, and measurement). On Wednesday, she tested for discrimination ability and perception (figure-ground discrimination, matching figures). Each of these packets took about thirty minutes to administer. Also, during the second week, Mrs. Lisa observed the students' memory ability (using memory blocks); their ability to describe objects, themselves, and their families; coordination skills (during gym); and listening skills. She also gave some individual students the Boetell Reading Test and listened to every student read orally. Based on these two weeks of observation and assessment, Mrs. Lisa was ready by the third week of school to begin the students on a regular schedule and begin assigning them to groups. It was at this point that term planning for the fall really began. Planning for winter term took place in December and over the winter break. Planning for spring term was completed just before or during spring break.

Planning Goals

Mrs. Lisa's term planning involves two major activities. First, she lays out in more detail the content she wants to cover in the next three months. This is especially important in science, social

studies, and math where much of her teaching will be done by units. Since more than one unit is taught during the term, the approximate length of each unit must be determined and dates must be specified to arrange for any special materials she may need. For those subject matters such as reading and writing skills where teaching is done on a daily and weekly rather than a unit basis, content priorities are established and activities are generated. Most of this is accomplished as part of the second major activity of Mrs. Lisa's term planning, the establishment of a weekly schedule.

The purpose and function of a weekly schedule in Mrs. Lisa's teaching was discussed in Chapter IV and will not be repeated here. To summarize, the weekly schedule as it is established each term reflects Mrs. Lisa's subject matter priorities for the term, content priorities within subject matters, and the basic methods that will be used in teaching. This is done primarily by allocating time to various instructional activities on a weekly basis. It is at this level of planning that the activity ideas generated earlier are elaborated to determine whether they can function adequately to present Mrs. Lisa's subject matter content and achieve her skill development goals. If so, then the activity is given a slot in the schedule.

The weekly schedule for the term is not fixed prior to the beginning of the term. After two or three weeks when the students have had time to adjust to the schedule, Mrs. Lisa reevaluates the format and may make some revisions. Most of these revisions involve moving activities to different time periods, rather than adding or deleting activities. This is due to the fact that most problems that occur in the

schedule are timing and scheduling problems rather than the "failure" of an activity.

In the fall, an additional task of term planning is the grouping that Mrs. Lisa does for reading and spelling. After testing student reading abilities, Mrs. Lisa decides how many reading groups she will have and initially assigns students to groups. Group composition may change as she obtains a more complete picture of individual abilities by working directly with the groups or as students rapidly improve or fall behind the other group members. Once reading groups were established, their composition rarely changed. This seemed primarily due to the large differences in reading groups. (Each group was reading at least a grade level apart.)

The grouping for spelling was based on a pretest on the district spelling list. Since differences between spelling groups was not as great as between reading groups, students were moved more frequently from one group to another. By the beginning of March, one group caught up with the group just ahead of it, and Mrs. Lisa combined them into a new larger group. Grouping in math was done on a unit basis and will be discussed under unit planning.

Information Sources

As opposed to yearly planning, term planning benefits from direct experience with the students. It is for this reason that Mrs. Lisa waits until the third week of school to do her fall term planning. The first two weeks involve mainly orientation to the classroom, pretesting, and group projects to provide Mrs. Lisa with the information she will need to group students properly and to decide which learning

activities will be most effective. Knowledge about the students' academic abilities provides Mrs. Lisa with the information she needs to make decisions about content and sequencing for the term. To decide on activities, she uses information she has gathered about attention spans, listening and perceptual abilities, cooperation, and likes and dislikes of the students during the first two weeks of school.

When making decisions about activities and the weekly schedule for the term, Mrs. Lisa gathers several pieces of information from the more general teaching environment. As the schedule is worked out, she must consider times when the students will be out of the room for gym, reading lab, music, art, and library. Times for these activities are determined during the first week of school and Mrs. Lisa's schedule must work around them. Also Mrs. Lisa must consider times when her aide or parent volunteers will be available to help her in the classroom. Another general restriction she must consider is the amount of time she has for teaching between breaks in the day caused by recesses and the lunch period.

Form of the Plan

The two major activities of term planning each take a different form. The elaboration of content for the term is done in the same spiral notebooks in which the basic yearly planning is done. This involves filling in the content that will be presented each week or specifying the beginning and ending dates for specific units. The weekly schedule for the term is worked out on a sheet of paper that Mrs. Lisa will put in her plan book and use as a guide for her weekly planning. Examples of those plans can be viewed in Appendix F. Prior

to making up the schedule, Mrs. Lisa has listed the activities she wants to fit into this term's schedule. When she sits down to arrange the activities, she also has available last term's activities and a list of times when aides are available. She then arranges and rearranges activities on her worksheets until the schedule conforms to her expectations. The steps taken in Mrs. Lisa's spring term schedule planning this year are presented in Appendix G.

Criteria for Judging Planning Effectiveness

The effectiveness of her elaboration of the content lists is judged in the same way as was the more general yearly planning. Mrs. Lisa is mainly concerned at this point with comprehensiveness of her list and that she has a basic idea of what content she will be teaching each week. This aspect of term planning is successful if it results in a more detailed specification of what will be taught during the next three months.

The schedule is initially judged using several criteria. First, Mrs. Lisa wants to include the activities she thinks should be a part of her weekly routine. Second, the schedule should be so arranged that she can have help from aides for those activities needing more than one adult. Third, she wants to develop a schedule which includes a balance of academic and non-academic activities as well as times in the classroom and times out of the classroom. Finally, she wants a schedule that accounts for the age, maturity, and stamina of her current students.

Level III - Unit Planning

Nearly all of the major planning decisions in science, social studies, and math are made at this level of planning. Prior planning in these areas had consisted mainly of deciding which topics might be good to treat at various times during the year. It is not until this level that decisions are made about specific content, materials, and activities. After the term schedule is established and most activities are functioning as routines, unit planning becomes a major focus of Mrs. Lisa's planning and the most time-consuming planning activity in which she is engaged. Mrs. Lisa begins planning for a unit during the month prior to its scheduled beginning. Most unit planning is done at home where materials can be spread out and left undisturbed until the unit is pieced together.

Planning Goals

Mrs. Lisa's primary goal in planning units for social studies and science is the development of a sequence of well organized learning experiences that present the subject matter content in a comprehensive manner and at an appropriate level for students of this age. As a result, much of her planning time is involved in gathering all the materials available to her on a specific topic and then generating as many activities as she can based on the materials. These activities are then organized and sequenced to present the content of the unit in a meaningful manner.

In unit planning for math, Mrs. Lisa's focus shifts from activities to content and grouping. Though special large group or whole class activities may be used to present certain concepts, most math content

is presented on an individual or small group basis. Prior to beginning a unit, Mrs. Lisa usually gives a pretest to assess each student's knowledge of the topic. Based on these results, she then arranges the students into homogeneous groups. Once the groups are established, Mrs. Lisa lists the content that each group will cover. In most cases, this chiefly involves listing worksheets or pages in the math workbooks that each group will do.

A secondary goal of Mrs. Lisa in much of her unit planning is the development of activities to integrate more than one subject matter area. Nearly all social studies and science activities integrate an aspect of writing skills such as spelling or creative writing. Examples of such activities include cutting out pictures of foods from various food groups, glueing them on a sheet of paper, and labeling them as part of the nutrition unit in social studies or drawing a dinosaur of one's own creation and writing a story about it as part of the dinosaur unit in science. Social studies and math were integrated, for example, in a unit on money. Students learned about economics and practiced their math by comparative shopping for groceries and by keeping individual checking accounts at a fictitious bank.

Information Source

By the time Mrs. Lisa begins any unit planning, she has a good idea of the abilities of her students in specific subject matter areas. This information allows her to set the difficulty of the content to be presented at a fairly accurate level for the group. Since all activities in science and social studies units are done as a large group, Mrs. Lisa also pays attention to the students' attention spans, their

ability to work together as a group, and their interests when she selects or creates activities.

In addition to the information she generally gathers about instructional materials, Mrs. Lisa pays special attention in unit planning to the length of a lesson, the time required for set-up, the format (media) of the material, the degree to which materials or activities are modifiable, and the "integrativeness" of materials and activities. Since programs and kits are available in science and social studies, they provide a major source of information and materials.

The district performance objectives are an influential source of information since they serve as a framework for deciding on what skills and content should be covered in a unit. The objectives supplement Mrs. Lisa's knowledge about the students' ability levels when she is deciding on the content for the unit. Mrs. Lisa does not, however, get out the objectives and match her activities to them. Rather, her knowledge about their general content serves as a general influence in her planning. The spatial arrangement of the room and the facilities available become an additional factor to consider when doing large group activities or when considering activities requiring that materials be left out for a long period of time or that have special light or heat requirements as in some science activities.

Form of the Plan

Unit plans for science and social studies usually take the form of activity or content lists and outlines. When Mrs. Lisa previews potential materials for a unit, she keeps notes on the content covered and possible activities that come to mind. She may also have an

outline of the organization and sequencing of topics within the unit. After all the materials have been previewed, Mrs. Lisa selects activities and begins sequencing them. Often, the sequencing is done as she begins fitting the specific activities into the times set aside in the weekly schedule for science and social studies. Math unit plans are usually in the form of lists of page numbers or dittos to be presented. When the students are grouped, Mrs. Lisa makes a separate list for each group. Sometimes topics and activities are specified in Mrs. Lisa's plan book. Examples of these plans are presented in Appendix F.

Criteria for Judging Planning Effectiveness

Since a unit is a smaller piece of the curriculum than is a term or a year, Mrs. Lisa can have a more detailed picture of the organization, sequence, balance, and flow of instruction than at more general levels of planning. These characteristics become more detailed and tangible and are major cues in Mrs. Lisa's evaluation of her plans. The comprehensiveness of the unit and the fit with her general conceptions of the district objectives also function as judgment criteria at this level, but potential student reactions and performance begin to play a more influential role than at higher, more abstract levels.

When activities are specified on a lesson by lesson basis in her plan book, she is able to visualize the unit in the most detailed form it will take until it is taught in the classroom. As such, Mrs. Lisa can get an impression of each activity. Before becoming a part of the unit, these activities have usually been judged to be balanced between passive experiences such as watching a film or listening to Mrs. Lisa

and more active experiences such as drawing, writing, and discussing. They also have been judged meaningful and interesting to the students and seem capable of presenting several basic ideas to the students in a manner that allows them to practice using the concepts or principles. In short, Mrs. Lisa uses potential student involvement and enthusiasm as often as she uses potential learning outcomes as criteria for judging planned activities at the level.

Level II - Weekly Planning

Life in Mrs. Lisa's classroom is most visible on a weekly basis. This is largely due to the weekly schedule she establishes and the resulting routines. Planning also functions most visibly on a weekly basis in Mrs. Lisa's classroom. This may be because weekly planning is recorded in the teacher plan book--where one might first look for signs of teacher planning. It may be due also to the fact that weekly planning is done at school, whereas more long-range planning is done at home or during breaks. Since Mrs. Lisa's classroom functions most regularly on a weekly level, weekly planning becomes the "nuts and bolts" planning that maintains regularity and continuity while being responsive to day-to-day changes. Weekly planning begins two weeks before teaching and is elaborated and modified up to the day of instruction.

Planning Goals

The major goal of weekly planning is to lay out the week's activities within the framework of the established weekly schedule while adjusting for interruptions to the schedule and responding to specific needs of the students. Mrs. Lisa is dedicated to the importance of

regularity and predictability of daily and weekly activities in which the students are involved. The schedule is established with great care to provide an optimal organization, sequence, and balance, and to reflect her instructional priorities for the term. Because of this effort, Mrs. Lisa strives to adhere to the schedule as closely as possible. Since the schedule rarely runs as planned, a large part of weekly planning involves modifying the week's activities while maintaining continuity and regularity in activities judged most crucial to student progress. This may involve rescheduling an important activity to another time or dropping a scheduled activity to insert a special activity. Since weekly planning is done two weeks in advance, the schedule can usually be rearranged to accomodate special activities or interruptions without losing an important piece of the curriculum. When rearrangement must occur, the goals of balance, variety, and so forth that were important in her original planning remain just as important in any replanning that is done.

Since most activities occurring on a weekly basis become well routinized after several weeks in the schedule, Mrs. Lisa's weekly planning rarely has to be concerned with components of activities other than content and materials. Advanced weekly planning allows her to prepare or collect needed materials well in advance of teaching and to specify basic content in order to maintain continuity and momentum in a certain area. To maintain this continuity while addressing any special or individual student needs, Mrs. Lisa must closely monitor student performance. This becomes most important for reading, writing skills, and those math activities not taught on a unit basis, since they run throughout the whole term without the closure provided by

unit organization. Mrs. Lisa is most concerned with monitoring and checking the students' understanding of materials and mastery of any skills being taught in "fundamental" areas such as reading, writing, and math. If she finds that an individual or group of students is having consistent difficulties, she will either spend some individual time with them or schedule another lesson to review the same topic. It was not uncommon for Mrs. Lisa to set back the lessons she had scheduled for the following week to make room for this type of activity.

A secondary though important purpose of weekly planning is to facilitate Mrs. Lisa's advanced planning for special activities in the room. Mrs. Lisa keeps a note card in her planning book to keep track of information that should be included in her weekly letter to parents. When she does her weekly planning, she often jots down notices or reminders about special activities that she will include in her next letter. In this manner, advanced weekly planning allows her to communicate special information to the parents which will facilitate the smooth functioning of activities in the classroom. To summarize, weekly planning presents the challenge to Mrs. Lisa of maintaining the "status quo" of the schedule while at the same time being sensitive to and adapting to constraints on time as well as to special needs of the students.

Information Sources

The main source of information about the students to which Mrs. Lisa attends in her weekly planning is their performance in activities in the preceding days and weeks. This influences her decisions about

what activities may be passed over as a result of time constraints and what subject matter areas need increased attention. Institutional constraints are important cues in weekly planning because of the influence they have on the schedule. When Mrs. Lisa begins arranging the activities for a week, the first thing she looks for is whether there are any scheduled interruptions in the week caused by professional development days (for which the students are absent), holidays, assemblies, field trips, and so forth. Two other factors she considers are whether there is a special day such as Saint Patrick's Day or Valentine's Day occuring during the week and the position of the week within the term. If, for instance, the week is toward the end of the term, the schedule may have to be mofified to accomodate the completion of units or special activities that should not be carried over to the beginning of the next term.

The major aspect of materials and resources that Mrs. Lisa attends to in her weekly planning is their availability. She is mainly concerned about the curtailment of a certain resource such as an aide or one of the resource teachers and whether or not scheduled materials such as films or kits have arrived. One reason that Mrs. Lisa plans in advance is so that these factors can be taken into account and any necessary schedule adjustments can be made.

Form of the Plan

Weekly planning is done in a standard plan book provided to all the teachers in the district. The book supplies enough pages so that each week can be laid out on two facing pages. Each page provides a row for each day of the week and three blocks for each day. If two facing

pages are used, there are three blocks available for the morning schedule and three blocks available for the afternoon schedule. Mrs. Lisa uses the middle blocks of each page for indicating recess; thus, she arranges her schedule into four instructional blocks analogous to the four teaching periods in a school day. (Refer to Figure 4.3 on page 88 for an illustration of these four periods.)

Mrs. Lisa's weekly plans consist of listing the activities which will occur in the teaching periods for each day. For some activities times are indicated and occasionally notes will be included specifying page numbers or special activities. The activities are written in pencil so that as things come up which influence the schedule, activities may be added or deleted or moved to another place in the schedule. Several of Mrs. Lisa's weekly plans are presented in Appendix F.

Criteria for Judging Planning Effectiveness

The effectiveness of weekly plans is judged according to the completeness of the plans, the degree to which the weekly schedule has been adhered to, and the flexibility of the plan to allow for time constraints or for interruptions and special activities. Mrs. Lisa also looks for the continuity that scheduled activities provide with unit lessons and on-going activities and the degree to which the schedule is responsive to special student needs and to opportunities for special activities presented by holidays or special community or school days. In short, the effectiveness of Mrs. Lisa's weekly planning is judged in the same manner as planning at other levels, by the fit between her goals for planning and the actual products and outcomes.

Level I - Daily Planning

Daily planning refers to the planning that is chiefly concerned with the next day's activities. Mrs. Lisa's daily planning takes place for the most part after school on the preceding day, although some preparatory activities may have been carried out over the last few days. Last minute preparations or revisions may also take place in the morning before school or during breaks in the day.

In Chapter II, planning was defined as a process of preparing a framework for guiding future action. To this level this framework has consisted of lists, outlines, and schedules. At the daily level, the framework produced by planning also becomes the physical arrangements and preparations made by the teacher. This physical framework influences action by increasing the efficiency of the teacher's instruction by reducing the number of things the teacher has to deal with prior to initiating an activity.

Planning Goals

Mrs. Lisa's daily planning seeks to accomplish four major purposes. The first is to arrange the classroom in order to facilitate the smooth running of the next day's activities and in order to reduce the number of things she will have to worry about or be involved with during her teaching. This involves activities like writing the schedule on the small chalkboard, setting up the station work assignments, gathering together and setting out materials, and writing assignments or problems on the chalkboard.

The second purpose of daily planning is to specify those components of activities not yet decided upon. Because of the routinization of

of classroom activities, the only decisions that are commonly made on a daily basis are those pertaining to content and materials. In cases where materials are closely linked to content, decisions about both of these components are often made in the several preceding days. This is because of the time involved in creating or arranging for many materials. The most frequent content decisions made at the daily level are in reading and in handwriting. Since most of the instruction in these areas is done in texts and workbooks, the only decision left to be made at the daily level is the selection of pages to be covered in tomorrow's lesson.

The third goal of Mrs. Lisa's daily planning is to fit the day's schedule to last minute intrusions and to the attitudes and working abilities of the students. This last minute fitting and adjusting of the schedule is necessarily done before school or at breaks during the day. This may be done as a result of a notice about a fire drill or assembly cancellation received in her box in the morning or as a result of Mrs. Lisa's judgment about potential student interest or involvement in a specific activity.

The fourth purpose of Mrs. Lisa's daily planning is to prepare the students for the day's activities. Mrs. Lisa's belief that it is important that the students are able to predict what is going to happen during the day was mentioned earlier, and it is largely for this reason that the schedule for the morning and afternoon activities is put on the small chalkboard and reviewed with the students soon after calling roll.

Information Sources

Two pieces of information that Mrs. Lisa is especially sensitive to at the daily level are clarity of instructions and set-up time. Clarity of instructions in texts or workbooks will make a big difference in the smoothness of activities, especially when the instructions refer to seat work to be done while Mrs. Lisa is with other students. This is usually checked closely so that she can make additional comments before the activity begins. The set-up time of an activity also influences the smoothness of transition between activities. Mrs. Lisa tries to assess this as accurately as possible so that advanced preparations can be made and so that as little class time as possible is consumed by this chore.

The student cues Mrs. Lisa attends to during the day also influence her daily planning. A rough evaluation of what the day will be like is often made based largely on the way the students come into the classroom in the morning. Mrs. Lisa feels that this is tied closely to the weather and often said, "When the barometer is up, so are the children; and when the barometer is down, the children are, too." In other words, when the weather is clear and sunny, Mrs. Lisa expects to receive less work from the students; and when it is cloudy or rainy, the children are usually quieter and work better. In addition to this initial judgment in the morning, Mrs. Lisa pays attention throughout the day to the students' interest, involvement, and enthusiasm related to activities. If these factors are low in the morning and a heavy academic activity is scheduled for the afternoon, Mrs. Lisa may substitute a less demanding activity. Mrs. Lisa tries to anticipate the attention levels and change-of-pace needs of the

students in her normal schedule, but occasionally last minute revisions are necessary.

Form of the Plan

Daily planning takes two forms. The most obvious form is the schedule that is written on the small chalkboard. This schedule is put up every morning and afternoon as a list of the day's activities. Examples and more detailed discussion of the daily schedule were presented in Chapter IV.

The second form that daily planning takes in Mrs. Lisa's classroom is the preparation and arrangement of materials and facilities in the room that guide and facilitate teacher and student actions during activities. These planning activities were mentioned earlier and include writing assignments on the board, rounding up materials for an activity, setting up the room in a certain manner, and so on.

Criteria for Judging Planning Effectiveness

Unlike higher levels of planning, Mrs. Lisa's judgment of the effectiveness of daily planning includes both structural and functional criteria.

The structural criteria apply to the planning that occurs in the afternoon of the preceding school day or in the morning before school begins. Planning is judged as effective if all the last minute preparations and decisions about content, materials, facilities and schedules have been made. Mrs. Lisa's almost compulsive need to have everything prepared before the students enter the room is the reason for the long hours that she keeps after school and the amount of work that she does at home. When talking about her daily planning, Mrs.

Lisa said, "If I don't get it done at night (in the afternoon), I'm afraid I won't have it ready in the morning, so I tend to take a lot (of materials) home."

The functional criteria used by Mrs. Lisa relate largely to "how the day went." The major cues that she uses to make this judgment are how noisy the students were during the day, and the involvement, interest, and enthusiasm communicated to her as the students participated in various activities. Mrs. Lisa feels it is possible to influence the day by either overplanning or underplanning. She feels overplanning can often restrict her spontaneity and flexibility in teaching, and that underplanning leads to long transition times and to unnecessary chaos in activities. Although higher levels of planning play an influential role in how activities come across in the classroom, it is only at the daily level that planning is judged by its outcomes. The evaluation of activities in the classroom are eventually stored and fed back to higher levels of planning, but the effectiveness of planning at these levels is rarely judged as a result of the outcomes produced by activities later in the year, term, unit, or week.

Connections Between Levels of Planning

The previous sections of this chapter have described Mrs. Lisa's planning at five different levels. These descriptions have portrayed aspects of her planning that are unique to each level, but have not been concerned with an important feature of the model, the connections and interactions of different planning levels. It is the purpose of this section to describe these connections and pinpoint times at which interaction is most likely to occur. Rather than examining each level

with its connections to the other levels separately, the discussion will focus on various times during the school year when interaction is most likely to be seen. Six planning times have been identified that involved the most visible interaction among the different levels of Mrs. Lisa's planning. They are: (1) the beginning of the year, (2) the beginning of the term, (3) the third week in the term, (4) the beginning of unit planning, (5) when the weekly schedules are planned. and (6) at the end of the school day. These connections are illustrated for fall term in Figure 6.2.

The beginning of the year provides opportunity for observing interaction among several levels. As Mrs. Lisa gets to know the students better in the first few weeks of school, her yearly planning is elaborated and modified. When this is taking place, fall term planning is also being laid out and a weekly schedule is developed. This planning does not react significantly with daily and weekly planning until the third or fourth week since the activities of the first few weeks are fairly standard orientation and diagnostic activities that Mrs. Lisa always uses in the first few weeks of school.

At the beginning of the term, one is most likely to see interaction between yearly and term planning. As the next term is laid out, yearly plans are consulted for general sequence and content. Since the weekly schedule for the term is only tentatively arranged at the beginning of the term, the third week in the term provides interaction among daily, weekly, and term planning. At this time, the schedule may be modified since Mrs. Lisa feels the students have had enough time to adjust to it and problems in the schedule are not merely related to student adjustment. Modifications are based on actual classroom

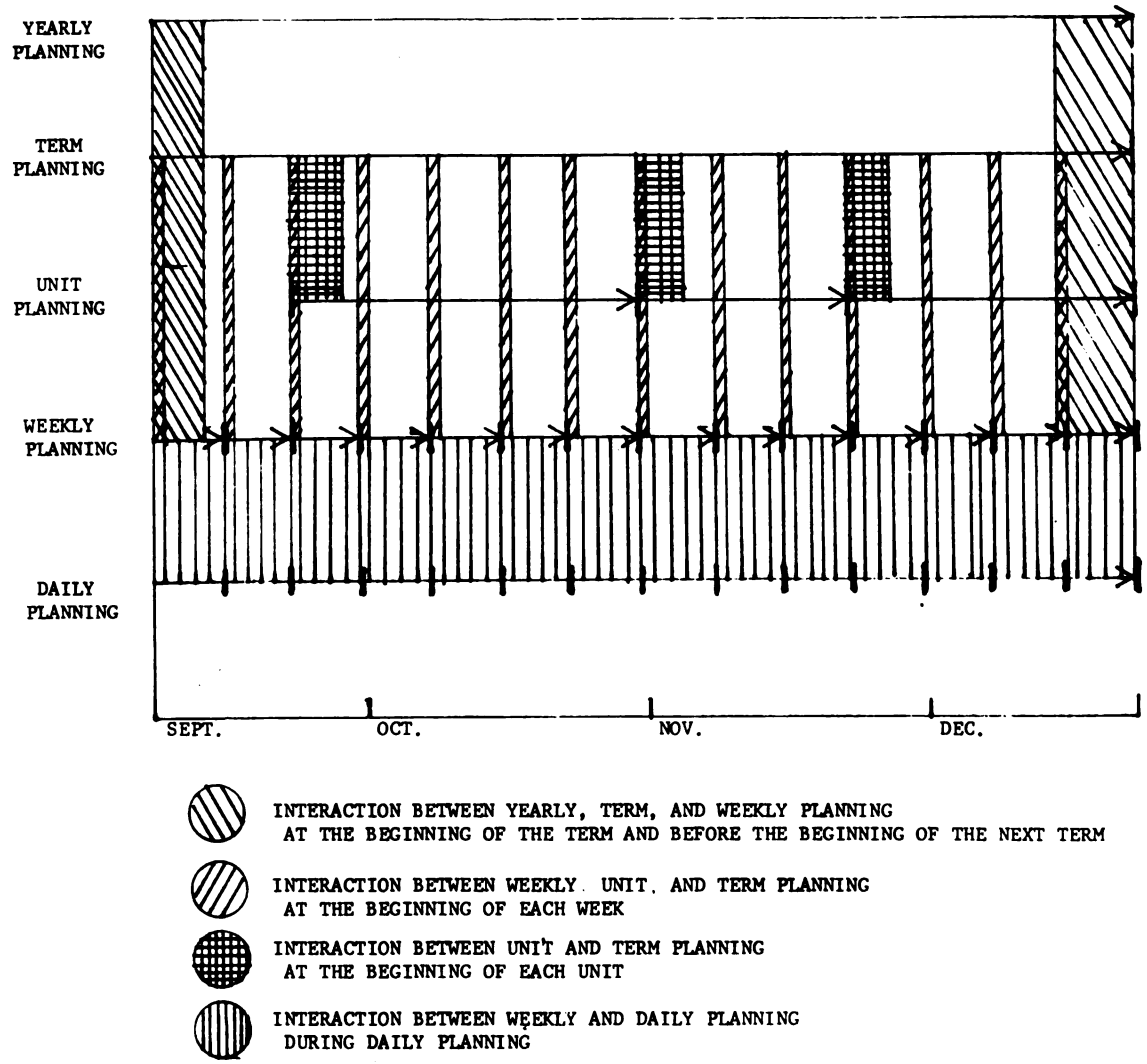


Figure 6.2 Interaction between levels of planning (illustrated for fall term).

outcomes and on problems Mrs. Lisa may have encountered in her weekly or daily planning.

When unit planning is beginning, interaction often occurs with term planning. The planned length of the unit and the number of periods set aside during a week influence the scope and length of the unit. Unit planning also interacts with weekly planning as the unit activities are being fitted into the weekly schedule. Weekly planning also requires connections with term planning as Mrs. Lisa integrates the week's activities with her goals and priorities for the term.

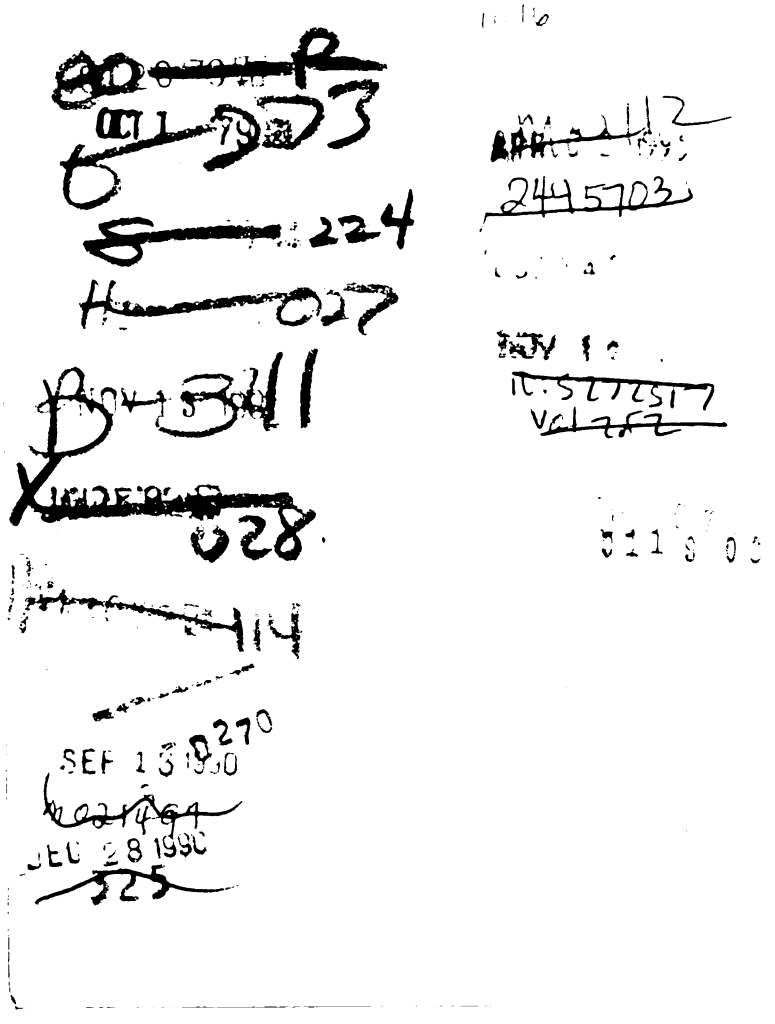
At the end of the school day, when most daily planning occurs, one is most likely to observe interaction between daily and weekly planning. Daily planning is usually a function of what has been specified for the week. It is also possible that the plans for later in the week may be modified as a result of the day's activities.

Each of these six times that have been briefly characterized may be thought of as potential research sites at which to examine Mrs. Lisa's planning in more detail. It is at these times that planning is most explicit since several planning levels are interacting. Although it would be unreasonable to assume that other teachers plan in identical ways as Mrs. Lisa, these times when her planning is most active and visible might serve as guides to strategic research sites in other teachers' planning.

Chapter Summary

The purpose of this chapter was to outline and discuss a structural model of preactive teaching. This type of analysis is important as a means to identify strategic research sites, to provide additional

information about decision processes, and to describe the nature and the degree to which planning activities differ. The structural model of Mrs. Lisa's planning identified planning at five levels: (1) yearly planning, (2) term planning, (3) unit planning, (4) weekly planning, and (5) daily planning. Each of these levels was discussed based on goals of planning, sources of information, form of the plan, and criteria for judging planning effectiveness. Finally, the connections and interactions among levels were discussed for six strategic times during the year.



CHAPTER VII

THE PSYCHOLOGY OF PLANNING I: DATA FROM OTHER FIELDS

Simon (1957 b) distinguishes three phases of decision: intelligence, design, and choice. Intelligence includes processes for scanning the environment to see what matters require decision. Design involves processes for developing and examining possible courses of action. Choice includes processes for choosing among courses of action.

Rational models of planning have as a rule concentrated heavily on Simon's third phase of decision and ignored the other two phases. Observations of Mrs. Lisa's planning decisions indicated processes related to choice, but these processes did not seem to be as prominent as processes related to problem formulation (intelligence) and design. Because of this, theories and research related to the functioning of these latter processes were examined and eventually served as a conceptual basis for developing a theoretical model of teacher planning. This model will be presented and discussed in the next chapter. The main purpose of this chapter is to present and discuss research from fields other than education that bear on the question of what psychological processes underly deliberative thinking.

This chapter reviews three areas of research and theory which influenced the final form of the planning model. The prominence of routines in Mrs. Lisa's planning suggested the importance of reproductive thought components in planning. The theory of Selz and de Groot's application of his ideas to chess thinking acknowledge the role that

reproductive thought plays in complex problem solving and decision activities and has provided many apparent parallels to Mrs. Lisa's planning processes. The prominence of efforts concerned with designing and creating materials and activities in Mrs. Lisa's planning prompted an examination of studies of designers and artists in other fields. Getzels and Csikszentmihalyi's (1976) work analyzing creativity in artists and the recent work on problem formulation and work strategies in architectural design provided additional insights into the decision processes observed in this study.

Reproductive Components of Thought

In this study, planning is conceived of as the process of developing a framework to guide future action by means of problem solving and decision making. Planning, like other forms of problem solving, is by no means a unitary process. It involves various components, materials, and operations. One component of human problem solving that has long been a subject for experimentation and discussion is the role played by past experience (Birch and Rabinowitz, 1951; Maier, 1930, 1931, 1945; Wertheimer, 1959). The classical distinction between reproductive and productive thinking is based in part on the differing roles that past experience may play in each type of deliberation. On the one hand, reproductive thinking is characterized as the solution of problems by means of the existence of stimulus equivalences in the problem situation and in the previously mastered situation (Maier, 1945). In other words, reproductive thinking is the process of arriving at a solution by directly applying previous learning. On the other hand,

productive thinking (Wertheimer, 1959) involves the repatterning and restructuring of past experience to meet current demands.

The planning process primarily involves productive thinking; that is, most of the situations or problems to which planning is applied are new and unique. However, it may be that reproductive factors such as knowledge and intuitive experience play an important role in information processing related to planning. Two researchers who have directly addressed the function of reproductive methods in problem solving are Otto Selz and Adriaan de Groot. Each of their theories will be discussed focusing on the contribution of past experience to their characterizations of human problem solving and decision making.[11]

The Theory of Selz

Otto Selz was a member of the Denkpsychologie group led by Kulpe at the University of Wurzburg at the turn of the century. He has been judged by some as the most important yet most generally underrated psychologist of the Wurzburg school, and only small portions of his work have been translated from the German (see Mandler and Mandler, 1964, for a portion). Because of this dearth of information on Selz's work, the following discussion relies heavily on de Groot's interpretation of Selz's theory and research.

---

[11]The work of Selz and de Groot is discussed in some detail in this chapter for the following reasons. No substantial translations of Selz's work exist in English, and the German versions are out of print. De Groot remains the primary interpreter of Selz; however, the work that contains his review of Selz's theory as well as his own theory of chess thinking (de Groot, 1963) is also out of print.

General theory. Most of Selz's work aimed at developing a conceptual model of directed thought. In his theory, thinking is characterized as one continuous activity and described as a "linear chain of operations." In this mdoel, each succeeding operation is determined by the outcome of the proceeding operation. In general, the course of thought process is determined by three factors: (1) the repertoire of "solving operation dispositions" available to the subject, (2) the features of the problem (including a "goal") as perceived and conceived by the subject, and (3) the subject's "determination" or intention to solve the problem. This third factor is the motivational factor that initiates and sustains the process and Selz's model is assumed to be valid only when this conscious determination exists.

The mechanism that maintains the chain of mental operations in Selz's theory is based on the concepts of "general linkings" and the "schematic anticipation." General linkings are Selz's replacement for classical notions of association. An association is supposed to link a mental disposition to concrete images. Selz's general linkings are of a more abstract nature and are supposed to link problem situations with general solving methods. Since these linkings are acquired for the most part by learning and are of an individual nature, Selz refers to them as thought habit dispositions.

These abstract general linkings direct the thought processes. Each next step is determined by the situation resulting from the preceeding step. The mechanism that "fuels" the process and keeps it going is referred to as schematic anticipation. A determined solution process begins with the starting of a goal. In setting this goal, Selz

assumes that there is an accompanying schematic anticipation of the consequence of reaching the goal. In other words, the goal-as-attained is anticipated in some incomplete, schematic form. Furthermore, this schema is accompanied by some gap that is to be completed and an experience of tension corresponding to the open gap. Thus, "This schematic anticipation, with its gap and tension, is considered to be the starting point for the further course of the thought process" (de Groot, 1965, p. 58).

The concept of schematic anticipation is very general and fundamental to Selz's analyses. The presence and dynamic function of anticipatory schemata are as much a part of complex problem solving activities in productive and creative goal settings as they are of simple, reproductive tasks. This will become more evident in the following discussion of those methods of problem solving proposed by Selz to be "the most general" or the most applicable to the largest variety of problems.

The most general solving methods. The distinction between reproductive thought and productive thought was apparently of fundamental importance to Selz since he published a separate book on each topic (Selz, 1913, 1922). Although de Groot says that the distinctions between the two modes of thinking were not laid out clearly, Selz's use of the two terms is similar to later use by Maier, Wertheimer, and others. Reproductive thinking, according to Selz, refers to those methods by which relational facts that are present in memory are activated and reproduced to solve a problem. Productive thought occurs in situations where no previously

formed knowledge complex can provide an immediate answer to a problem. Selz's "most general solving methods" refer to the latter mode of thinking.

Selz distinguishes between two types of methods within productive thought. Methods used for finding of means (Mittelfindung) refer to the most general heuristics used in problem solving, invention, creation, and so forth. Methods for means application (Mittelanwendung) include such general solving methods as ordering, trying out, and checking. Since the understanding of means application methods is less problematic and will be mentioned later, the focus here will be on those methods used for means finding.

Means finding in directed productive thought. The simplest way to solve a problem is to actualize or call up means-ends connections already existing in memory. This reproductive process is very important in productive thought, according to Selz, and is characteristic of processes he refers to as the "method of determined means-actualization." Three cases of means actualization are differentiated by Selz: (1) purely cognitive actualization, (2) automatic actualization of means, and (3) routine actualization of means. Purely cognitive actualization occurs in those instances where one has the conscious know-how to proceed but lacks application experience using those means. In this case, one can at any time actualize a solution to a problem, but only on the basis of cognitive acquaintance with the means-ends relationships.

Automatic actualization of means occurs when one possesses an automatic solution complex for solving the problem. These complexes are

are learned "automatically" as a result of experience, and when a question such as "How do you do it?" is asked soon after the behavior, it cannot be easily answered. The best examples of automatic solution complexes are motor skills. If, for example, a baseball player is asked to explain how a fly ball is caught, he is usually at a loss for a verbal explanation of the perceptual and motor skills involved in the task. This also holds true for some intellectual skills, and the same response may be encountered when asking similar questions to an experienced chess player, physician, or teacher.

The third method of means actualization that Selz discusses is routine actualization of means. This refers to situations where one has not only the knowledge of a method for a solution but also has direct application experience. Although also based in experience, this method is different from automatic means actualization in that one is able consciously to report the method used.

If one does not possess the necessary know-how to solve a problem, then it becomes necessary to find new means to produce new results. Methods for finding new means in productive thought are discussed by Selz under the heading of "determined abstraction of means" and are the second main type of directed productive thought activity. In general, means abstraction refers to methods used for constructing new means-ends connections previously unknown to the problem solver. Selz is unclear in his explanation of how this abstraction occurs, although the direction of the process is supposed to be determined by a corresponding schematic anticipation of the result of the abstraction, that is, of a solving method that may be successfully applied to the problem. The three subtypes of determined

means abstraction enumerated by Selz are (1) reproductive abstraction of means, (2) coincidental abstraction of means, and (3) immediate abstraction of means.

Reproductive abstraction of means occurs in situations where one knows or has experienced a specific means-ends relationship but has never really hit upon the idea of using that means as a way to reach that specific end. This is often difficult to distinguish from purely cognitive means actualization. De Groot explains the difference in the following manner. The individual is cognizant of a relationship such as "A leads to B" (A --→ B) but the serviceability of using A to attain B has never dawned on him. The schematic anticipation in the form of "a means x is sought in order to attain B" activates the complex A --→ B and at the same time activates the complex's property--"A can be used as a means to attain B." De Groot says that this mental operation is reproductive since it is based on the actualization of a memory complex, but the realization that A leads to B is new knowledge. In later situations where this knowledge is needed, it would most likely be produced as a result of routine means actualization since the previously acquired awareness of the means-ends relationship is retained.

The second method of means abstraction is coincidental means abstraction. This occurs in situations where one has searched for means to reach a certain goal with no success. At some later time when one is still under the influence of the uncompleted task, an accidental or coincidental perception of the relationship may lead to the realization that a certain means may be used to reach the temporarily forgotten goal. Selz says that this type of actualization is most common

in situations where one is strongly involved, if not obsessed, with solving the problem. Even though there is no active motivation or determination functioning at the moment, there is a relatively strong "determination disposition" that is easily activated. As a result of perceiving the partially related event or means-ends structure, the problem and the uncompleted schematic anticipation are activated and the means is seen as a way to reach the desired goal. Selz explains this phenomenon by suggesting that once a task has been temporarily abandoned and then reactualized, the schematic anticipation appears in a less detailed and more general form. If the specificity of original schematic anticipation had prevented the discovery of a specific solution and the specifying conditions are not all necessary, then the reduction of restrictions and the dropping out of unnecessary details and conditions increases the space in which a workable solution can be found.

This notion of "inner coincidences" was used by one of Selz's students, Julius Bahle, to explain the phenomenon of inspiration, specifically musical composition. Bahle (1939) showed that in composers, there often exists an extraordinarily strong motivation or disposition to produce works according to a certain style. This disposition may often generalize into a "plan" of expressing some particular feeling or fundamental experience in music. These "productive experiences" as Bahle called them produce very strong determination dispositions that may be easily activated by some chance thought, perception, or image. In addition to setting the stage for these internal coincidences, Bahle also found that composers often tried to arrange their outer environment to encourage such fruitful occurrences. This was done by keeping

to certain schedules, following special food and drink habits, working in certain climates and locales, and so on. Thus, by "living with a problem" and by arranging the outer environment to facilitate certain perceptions and mental experiences, it may be possible to increase the probability of inspirational and creative moments.

The third method of finding new means to solve a problem is called immediate means abstraction. This occurs as a result of a "structural insight" into the nature of the task. Insight here is used in the true Gestalt sense of the word since the means are "read" from the structure of the task either during the original perception or after some immediate restructuring. De Groot says that this type of actualization is most frequent in situations such as practical, geometric, or chess problems where visual structures or schema play a strong role. He does concede, however, that this also can occur in the absence of these visual structures where one is able to perceive some logical, causal, or other structure in the task. He also states that the degree to which this method may be applied by an individual is a function of the amount of experience. "Experts" in some field who immediately see how to proceed after inspecting the problem provide one example of this method. In this case, the materials structure themselves, so to speak, and this immediate abstraction process may play an important role in influencing the direction of further problem solving.

One of the major questions arising from Selz's mechanistic conception of productive thought is how does it account for creativity? If thought is conceived of as a determined chain of solving methods, each of which is reproductively actualized and set off by the results

of the proceeding method, how are new results produced? The first part of Selz's answer relates to the methods of means actualization and abstraction. He makes the point that even though the methods of means actualization are using old means, they lead to new results simply as a result of applying old means to new materials. And even though the three methods of means abstraction are actualized by reproductive processes, their application to the immediate problem is new to the problem solver. The previous discussion of composer inspiration is an example of this process working.

The second part to Selz's answer about how his theory accounts for creativity is related to his third main method for directed productive thought--"productive utilization of previously abstracted means-ends relationships." This method draws further attention to the activities of a creative individual when not at work solving a specific problem. Selz found that these individuals often methodically build up their creative power. De Groot discusses the way in which mental productivity is developed outside of specific problem solving situations.

> First, of course, the repertoire of solving methods in a particular field is built up by learning processes, both from books and by experience. Theoretical study leads to cognitive mastery of means that can then be applied through "cognitive means actualization," while experience "in the trade" continually extends and differentiates the subject's arsenal of automatic and routine actualization methods (p. 68).

A "creative" individual may go beyond these steps, according to Selz, by imposing on himself a permanent motivation or "set" to build up and improve his repertoire of solving methods. This set may permeate all aspects of the person's activities, so that means are collected and stored from every context and situation in which the person finds himself. De Groot proposes that his process may become particularly

important to artists who often draw on personal experience for a source of inspiration since, "They are liable to develop the set to look for and then to store materials and expressive means which they may find potentially useful, regardless of whether specific creative plans are in mind" (de Groot, 1965, p. 68).

To summarize, Selz portrays productive thought as the task of finding appropriate means to provide solutions to problems for which one has no immediate solution. The heuristics used to accomplish this are grouped under the rubric of methods for the finding of means. The two most general methods for means finding are means actualization and means abstraction. Means actualization refers to methods where means-ends relationship already exist in memory and are merely actualized or called up to solve the problem. In this case, the solution itself is not immediately available, but means to reach the goal are available in some form. The second general method, means abstraction, occurs in situations where one does not possess the know how to solve a problem and must search for new means. Under each of these methods, three subtypes of methods are proposed: purely cognitive, automatic, and routine actualization of means and reproductive, coincidental, and immediate abstraction of means. The third general method for means finding is called "productive utilization of previously abstracted means-ends relationships," and refers to the activity of collecting and storing means for possible use at some later, undetermined time. This latter method along with the method of coincidental abstraction of means were used to illustrate how Selz's theory can account for creative thought.

Linking of solving methods. According to Selz, the complete thought process is comprised of a sequence of operations resulting from strictly lawful combinations and linkings of solving methods. One might then ask what initiates, controls, and terminates this process? In a general form, problem solving is conceived of as a series of alternating phases of "abstraction" (the finding of subgoals in a task) and "realization" (the application of appropriate means). Transitions from "a-phases" to "r-phases" (a --→ r) are simply determined by finding a and then applying means r. The transition from r to a (r --→ a) does not, hwoever, automatically proceed from the completion of the previous operation. To explain this r --→ a transition, Selz offers the notion of a "determination to realize the composite operation." According to this concept, there is a higher order motivation to complete the task which activates a new abstraction and its corresponding realization phase. This return to higher order goal or to the main problem is proposed as the mechanism for stimulating completion of the whole task.

The process just described where the sequence of operations is determined by previous successful operations signalling following operations is referred to as "cumulative linking." The other major form of linking that occurs is called "subsidiary linking." Subsidiary linking occurs when the next solving method to be activated takes the place of one that has just failed to obtain the goal or subgoal. This operation implies a return to the original task where the schematic anticipation of the goal-as-attained will necessarily be modified based on the knowledge one now possesses about how not to proceed.

Although Selz speaks about trying to reach the same goal, the goal setting is in reality somewhat modified as a result of experience.

The question of which solving methods will be actualized at a given point in the problem solving process is based on a strict deterministic formulation. First, it is determined by the specific system of general linkings--both cumulative and subsidiary--in the individual. Second, it is based on cues in the current stage of the problem situation. General linkings between solving methods and specific problems are determined by individually acquired reaction dispositions each of which is linked to specific types of internal and external situational stimuli.

Phase structure and Bahle's work with musical composition. The alternating phase structure mentioned in the previous section becomes especially important in more complex situations and with more complex tasks. It also becomes more visible. De Groot reports that such a phase structure has been reported by all investigators who have worked with protocols of actual thought processes. Although this type of phase alternation was traceable in Selz's relatively simple tasks, this motion was more thoroughly elaborated and illustrated in Bahle's work with musical composition.

As mentioned earlier, Julius Bahle was a student of Selz in the early thirties. Although Selz's influence on his work is rarely acknowledged in his writings, Bahle's studies are viewed as a direct outgrowth of Selz's work. Bahle chose to analyze musical composition, more specifically song writing, using fascinating and ambitious experimental method that is described by de Groot:

> After some highly interesting laboratory experiments, Bahle (1930) sent eight carefully selected poems to a large number of well known composers. He then requested them to put one or more of the poems to music and, additionally, to make daily protocols on the progress of their work. In order to facilitate the latter task and, in particular, in order to furnish the composers with the point of view from which such an uncommon task had to be carried out, he enclosed an elaboarate instruction...as well as a questionnaire. The questions referred to the composer's motives in choosing a certain text, possible phases in his developing the composition, etc. Moreover, the composers were requested to turn over all sketches and notes which they had made during their work. As a result of the skillful choice of the poems in addition to the carefully worded questions and instructions...Bahle's experiment by correspondence (Fern Experiment) became a great success. No less than 32 composers cooperated, together producing a wealth of valuable data. Some of the participants, it is true, could not be inspired by any of the eight poems, so they instead reported on a song composition using a text of their own choice. The materials collected in this way were compared with historical data from letters and biographies and worked into an integral conception of musical composition (pp. 79-80).

Bahle used a more relaxed theoretical model than did Selz and did not insist on the same mechanical, "reflexoidal" characteristic of productive thought processes. The creative process is described as a "methodical activity structure" that stressed a high degree of organization but was not as mechanistic as Selz's "system of specific relations."

Bahle (1936, 1939) showed that the process of composing a piece of music begins with a schematic anticipation of the completed work (the goal-as-attained) that is very abstract and general and often includes hardly any musical notes. As a result of attempts at solving subproblems (or "specific work problems," as Bahle calls them) or the main problem, the total goal conception (de Groot's term) is gradually modified until the anticipatory schema applied in successive goal settings is gradually filled out. In this manner the outcomes--both successes

and failures--of each solving method not only contribute to the completion of the problem, but also to the shaping of the goal as conceptualized.

De Groot states that, "The characteristic feature of this process is alternation and interaction between the anticipations on the one hand and the results of attempts at subproblems on the other" (p. 75). Bahle confirmed Selz's notion of the influence of the anticipation on the realization or elaboration of the subproblem (the a --→ r transition mentioned earlier). He showed that the specific work problems established by the composer directed and determined the following elaborative phase. He also showed the reverse influence; that is, the effect on the outcomes of specific elaborations of specific work problems, or in Selz's terms, the schematic anticipation that is to govern the next phase. Bahle's work illustrated the pronounced influence of successful and unsuccessful elaborations and completions on changing the structure of the goal conception to such a degree that he labelled this interaction between anticipations and results "the principle of creative form-making."

By observing a task which occurs over a much longer period than those examined by Selz and one for which the goal is self set, Bahle was able to highlight the importance of goal changes as a result of subproblem elaborations. This notion of problem development was also reflected in the work of Karl Dunker (1945) when he said that, "What is really done in any solution of problems consists in formulating the problem more productively."

In addition, Bahle also showed that linkings between solving methods do not always function as immediately as in Selz's tasks. This

is especially true for subsidiary linkings. Bahle found that pauses were quite common during creative activity setting the stage for processes such as coincidental means abstraction. This notion of "creative pauses," as Bahle called them, became important elements in his theory to the extent that he considered them regular parts of the process as a whole, forming "meaningful links in the methodological activity structure."

Thought and Choice in Chess; de Groot's Theory

In the late 1930's, Adriaan de Groot, a student at the University of Amsterdam, who, in addition, was an international class chess player, took up the problem of describing the thought processes underlying the skilled chess player's choice of a move. In his own words, "Why do masters find the good moves that patzers overlook?" The simple experiemental method that he used was to present his subjects with an unfamiliar board position taken from an actual tournament game and ask them to find and play the next move as if they were participating in the game. While doing this, he asked them to "think aloud" during the process, giving as complete a rendering of their thought processes as possible. Twenty-two subjects were used in his studies ranging from grand masters (including two world champions) down to "second class"[12] players. De Groot's goal was to arrive at a general description of the structure and dynamics of chess thinking as a basis for theory formation.

---

[12]Equivalent to a class C rating on the United States Chess Federation scale.

The basic framework adopted for de Groot's research was Selz's conception of thinking as a hierarchically organized, linear series of directed operations. De Groot's work also served as a test of Selz's theory in a more elaborate and complex task situation. Two aspects of de Groot's findings will be discussed in this section as a way of summarizing his theory. First, the phase structure that was found to be prominent in chess thinking will be described, and, second, general methods of chess thinking will be discussed.

Phase structure of chess thinking. De Groot found that the basic structure of chess thinking is made up of the alternation between phases of direct analysis (elaboration) and phases involving integration, abstraction, and restructuring. There are three general phases that he discusses: phases of orientation, elaborative move phases, and trasitional phases.

The orientation phase is the first phase to be visible in de Groot's move selection problems. This is the subject's first exposure to the board position where he considers the position, orients himself to it, and lets the problem "sink in" and become structured for him. De Groot has also called this the phase of problem formulation since it is at this point when the subjective "problem" is formed and concretized by the subject.

Once the subject begins exploring possible moves, he enters an elaborative move phase. This phase is characterized by the working through and analyzing of the move to some degree until a preliminary result regarding the feasibility of the move can be reached. After the orientation phase, chess thinking is characterized by the subject's

examining a large number of moves one after another. That is, there is a string of elaborative move phases involved in each choice of move problem. It is also possible that there is more than one elaborative move phase devoted to examining one possible move. This is especially true in processes of longer duration which de Groot calls "reinvestigation of the same solving proposition."

A move possibility is rarely selected in isolation from a more general goal or plan that a player has in mind. It is usually a part of or a means for reaching a more comprehensive "board goal." These general goals direct the player's strategy for a certain period of time and, for this reason, are referred to as plans. Plans are part of the "total goal conception" that the subject develops early in the orientation phase. The total goal conception is the complete formulation of the problem developed by the subject that includes not only the problem structure, but also notions of difficulty and solvability, methods that may be applicable, dispositions, intuitive and emotional preferences, and so on. Like Selz's schematic anticipations, the total goal conception is characterized by incompleteness since it refers to notion of the goal-as-attained.

De Groot found that the transitions from one elaborative phase to another do not always occur immediately, nor are all elaborative phases devoted to calculations and direct investigations of move possibilities. For this reason, he talks about a third aspect of chess thinking called "transitional phases." In this phase, thought is less rigid and more "open-minded" and is characterized by reflecting, integrating, and abstracting. The function of these phases is to integrate the operations that have preceeded and to prepare for the next

investigations. Transitional phases are most common, according to de Groot, when there is no longer available any pre-established, direct connection from the result of an investigation to the next elaborative method or when as a result of continuous negative results one runs out of subsidiary methods at one level. When this occurs, one is forced to return to a more fundamental problem and reevaluate further action. It is during this transition phase that the problem (goal conception) may be reformulated as a result of abstracting new possibilities and relationships from results thus far and by integrating and restructuring this new information. In short, transitional phases perform the same functional purpose as Selz'a Mittelfindung methods; that is, they are involved in finding new means or in this case new moves, new plans, new approaches to and views of the problem, new subprograms, and so forth.

General methods of chess thinking. De Groot defines a solving method as a "typical problem transformation." In other words, he felt that,

> Whenever a particular transformation is found to occur predictably in a number of solving processes (protocols) that result from Aufgaben[13] of a distinct, definable type, the transformation can be called a solving method (p. 280).

De Groot agreed with Selz (1924) that

> Every directed thought process up to the attainment of the goal or to the subject's abandoning his solving attempts can be described as a chain of sequentially corresponding solving methods that are cumulatively or subsidiarily linked (p. 11).

---

[13] Aufgaben refers to the general task in a problem situation.

Three frequent and general methods of chess thinking that will be discussed in this section include "plan formation," "progressive deepening of the investigation," and "trying out."

Plan formation. De Groot defines plans as incompletely defined long-term schemes for action. These schemes serve as concrete, strategic goals to guide the following investigations, in contrast to the subject's general mating or drawing purpose. Plan formation generally takes place in the first phase of chess thinking and has mainly a directive and selective function. A plan functions as an aid to the choice of move decision by organizing and delimiting the group of "considerable moves" (moves stated by the subject as worth considering). In this manner, the problem is transformed by narrowing the moves to be considered.

Another problem transformation that occurs in the plan formation is grouping changes. What begins as a multiple choice problem is reduced to a binary choice problem by dividing the "considerable moves" into two groups: those moves fitting into the plan, and those moves are not fitting into the plan (or possibly fitting into another plan). As a result, the problem is simplified and transformed since only what fits into the plan need be investigated.

A third transformation that may occur as a part of plan formation in a more general sense is "stipulating the order of investigation." This refers to ordering of operations in advance on either a conditional or unconditional basis. This ordering is, however, to be distinguished from other "ordering" operations that proceed routinely and

automatically as a way of investigating possibilities during elaborative move phases.

Progressive deepening. Progressive deepening refers to a process of investigation that is characteristic of many lengthy and difficult choice-of-move problems. It refers to the analysis of a certain move or plan that takes place in a series of successive phases of reinvestigation. This process includes two aspects. First, the investigation broadens itself by growing new branches containing new considerable moves or countermoves. Second, it deepens itself by repeatedly taking up the move or plan and calculating its results more thoroughly.

The exact form of the investigation is not predetermined, but rather it is what de Groot callls a "conditionally composite operation." These types of operations usually proceed by the following format:

> If a calculation leads to satisfying results, other variations are tried out (attempts at strengthening) while the same plan and first move are retained; if the variations fail, other first moves are tried out; if those also fail, the entire direction of the investigation is changed (another plan) (p. 263).

This process can be illustrated in de Groot's four phases of deepening:

1. The First Phase of Orientation orients the play to possiblities for moves in a general direction and to general consequences of moves.

2. In the Phase of Exploration, the player beings trying out (rather than investigating) possibilities by calculating a few sample variations a few moves deep. If these prove unsatisfactory, then they are temporarily set aside.

3. The Phase of Investigation involves a deeper search for possibilities that are more sharply defined. Move

variants are calculated and they are calculated more deeply and exhaustively.

4. The Final Phase of Proof is made up of checking and recapitulating as the player strives to develop a subjectively convincing argument to support or reject a certain move or plan.

Progressive deepening is not always a voluntary or pre-planned process. De Groot has called progressive deepening a subsidiary method since the subject hopes that a satisfactory move will be found in the first or second investigation, and he will not have to investigate further. This can be seen in early phases of deepening where the subject quickly circulates several promising moves hoping to make further investigation unnecessary. It is usually the case in more difficult problems that further investigation must be carried out, but sometimes early calculations will succeed. The importance of progressive deepening and its prominence in difficult problems may, therefore, be due to its orientation towards economical thought.

Trying out. In chess thinking, trying out as a mental operation is a very important method in thinking and decision making. If the entire thought process is envisioned as an "empirical though investigation" (de Groot, p. 293), then trying out serves as a general method to determine the worth of various moves or plans. In some decision making situations, variations and alternatives may be tried out by actually doing them. In chess, however, this luxury does not exist, and trying out can take place only in thought.

Trying out as a method can be distinguished from the process of trial-and-error in several ways. When using the method of trying out,

one always exhibits a clear sense of direction. The process is usually put forward in the format of "If...is tried, then ...will result." The word if implies that one is working within a well defined goal setting (schematic anticipation) trying to check out fairly specific expectations. This specific orientation towards direction, selection, and evaluation that is set up by anticipations does not exist in trial-and-error processes.

Another basis for distinction is that trying out takes place in constant interaction with problem development. Therefore, as a result of trying out, much more specific types of information flow back to the subject than in trial-and-error. De Groot states that in trial-and-error processes, there is only room for good and bad experiences; but in trying out, the subject gains information about the problem in the form of qualitative results and generalizations, evaluative refinements, and structural and causal "insights." Trying out takes place in the form of a complex, organized process where every next move must be chosen from a group of considerable moves based on an idea or plan that is, in turn, part of a specific goal conception. Thus, trying out as a method is based on partial insight into the problem and occurs in cases where the subject has certain vague anticipations about the result.

De Groot specifies three possible functions of trying out. The first function of this method is to aid the subject in hitting on a solution for a main or subproblem. If an attempt is successful, then the method can lead directly or indirectly to a solution. Second, trying out can function to increase the information on the problem. It does this by specifying and concretizing the problem, by adding new

information and experiences to the total goal conception, and by further defining the group of considerable moves. The third function of trying out is the discovery of new means. It is in this capacity that Selz describes trying out:

> The trying out of several solution possibilities is a general operation for the finding of means. It must be applied by (animal and) man whenever it is impossible via determined immediate means-abstraction to discover structurally based solving methods and where firm empirically based correspondences are not yet at hand (Selz, 1922, p. 645).

Trying out also favors the occurrence of insight (coincidental means abstraction) and serendipity through trying various calculations and modifications.

Summary

This section has focused on two theories of productive thinking that emphasize the importance of reproductive thought components. Selz depicts problem solving as a hierarchically organized, linear series of directed thought operations energized and directed by a schematic anticipation of the goal-as-attained. The most general solving methods were described as various ways to actualize or abstract means from memory. In this manner, productive thought is portrayed as a determined chain of solving methods each of which is reproductively actualized or abstracted and set off by the results of the proceeding method.

This theory was elaborated by Bahle's work on thought in musical composition and by de Groot's work on chess. By looking at longer, more complicated processes, a characteristic phase structure was described in which thought progresses as an alternation between phases of

direct analysis and elaboration and phases involving integration, abstracting, and restructuring of the schematic anticipation (Selz), specific work problem (Bahle) or total goal conception (de Groot). Thus, problem solving is portrayed as a process that involves problem formulation and development as well as problem solution. These general solving methods--plan formation, progressive deepening and trying out--that de Groot had found important in chess thinking were then discussed. Each method was described as involving a transformation of the problem as well as reproductive thought processes.

Problem Finding in Art: the Creative Process

Thinking, especially decision making, is too often equated with rationality and characterized as systematic deliberation based on specific laws of logic and inference. This is particularly true of rational models of planning portraying the process as one primarily involving choice among specifiable alternatives based on the outcomes of each alternative and the objectives of the decision maker. In this study, Mrs. Lisa's planning did not function according to this description. It followed much more along the lines of a creative process, where efforts were not aimed at solving a structured problem, but rather focused on fashioning new problems. For this reason, planning was viewed as a process of problem finding and development, in addition to a process of problem solving and decision making.

In the previous sections of this chapter, problem formulation repeatedly appeared as an important process in productive thinking. The reworking and reformulation of schematic anticipations and goal conceptions were shown to be crucial aspects of problem solving in

tasks as apparently divergent as selecting a move in chess and creating a musical composition. What was overlooked in these studies was how the problem was first discovered or found. This is primarily due to the fact that these researchers were concerned with problem solving and thus supplied their subjects with the problem.

There are many situations where no problem exists or where the problem is so generally stated that one's first task becomes that of "finding" the problem. This is especially common to areas more generally regarded as creative, such as art and music, but it is common to science as well. In his text on physics, Albert Einstein makes the following point:

> The formulation of a problem is often more essential than its solution, which may be merely a matter of mathetical or experimental skill. To raise new questions, new problems, to regard old problems from a new angle, requires creative imagination and marks real advance in science (Einstein and Infeld, 1938, p. 92).

The only systematic investigation of problem finding that exists today has been done by Getzels and Csikszentmihalyi (1976). In this study, they chose to investigate creativity in artists by examining how they discovered and formulated the problems on which they chose to work. This work will be discussed here in three parts. First, Getzels and Csikszentmihalyi's general theoretical framework and the problem situation used for the study will be presented. Next, the behavior observed in the problem finding situation will be described; and finally, the relationships between problem finding and creativity will be discussed.

Problem Situations

The general conceptual framework adopted by Getzels and Csikszentmihalyi for this study is that of viewing the creative process as a response to a problematic situation. As such, the main elements of creativity are the same as those of other problem situations and include the phases of (1) problem formulation, (2) adoption of a solution method, and (3) reaching a solution. Based on these three structural elements of problem situations, Getzels and Csikszentmihalyi developed an analytical model of various problem situations and their related cognitive functions. This model is illustrated in Table 7.1.

At one extreme of possible problem situations are "presented problem situations" (type-case 1). In this situation, the problem has a known formulation, a known (routine) method for solution, and a recognized solution. The only task remaining is for the individual to follow the established steps for finding the solution. The primary mode of thought is memory and retrieval, since "all the problem solver has to do is plug the given data into a known formula to find the solution that is already known" (p. 81).

In type-case 2, the situation is the same except that the method of solution is also unknown to the problem solver. The primary task of the individual becomes that of reaching a solution matching the one already known by others. Getzels and Csikszentmihalyi illustrate this type-case with Wertheimer's classic problem, "How would you go about finding the area of a parallelogram?" Since the answer is not known by the individual, his mode of thought must switch from memory to reasoning.

Table 7.1

Types of Problem Situations and Related Cognitive Functions

Problem Situation	Problem Formulation	Method of Solution	Solution	Primary Cognitive Function Involved
Type - case 1 (Presented problems)	known	known	unknown	memory
Type - case 2	known	unknown	unknown	reason
Type - case 3 (Discovered problems)	unknown	unknown	unknown	imagination

The third case type, at the other extreme of problem situations, is what is called "discovery problem situations." Here the problem has neither a known formulation, a routine method of solution, nor a recognized solution. At this extreme, only the "dilemma" is presented, and the problem to be solved must be discovered and identified by the individual. It is in this situation that the individual must become a "problem finder."

Getzels and Csikszentmihalyi specified three steps involved in becoming a problem finder: (1) one must feel that there is a challenge needing resolution in the environment, (2) one must formulate his feeling as a problem, and (3) one must attempt to devise appropriate methods for solving the problem (p. 81). An additional difficulty occurs in this type of problem situation. Since the problem has been discovered and solved by the individual, there is no predetermined standard to which the solution may be compared. The only way that the solution can be accepted or rejected is on the basis of a critical, relativistic analysis. It is this type of analysis that is at the heart of art criticism.

The central question that Getzels and Csikszentmihalyi formulated for study was: "Is there a significant relationship between the problem finding behavior of fine arts students and the aesthetic value, especially the originality, of the drawings they produce?" The specific situation in which they chose to examine problem finding was the preparation for and drawing of a still life.

The study was conducted at the School of the Art Institute of Chicago with thirty-one fine arts students. Each was asked to select from a constant arrangement of twenty-seven objects, arrange them any

way he wanted, and then draw the arrangement. The study was conducted in an empty room at the Institute that had been fitted with all the materials and paraphernalia normally available in an artist's studio. During the selection, arrangement, and drawing processes, an observer kept a running record of the students' behaviors, and photographs of the work were taken periodically. At the end of the period, the student was interviewed to assess the reality of the situation and to get a subjective account of the artist's experience during the experiment.

Problem Finding

Problem finding in this study was observed in two stages: the problem formulation stage which refers to the student's behavior before beginning his drawing, and the problem solution stage that begins once a drawing is started. During the problem formulation stage of the experiment, three types of behavior were observed and quantified: (1) number of objects manipulated (out of twenty-seven available), (2) uniqueness of objects chosen (based on a score corresponding to the rank order frequency of which each object had been used by the sample as a whole), and (3) exploratory behavior during selection and arrangement (based on the amount of active manipulation and experimentation with an object before putting it into the arrangement).

Three behavior dimensions were also observed during the problem solution stage of the study. The first dimension was the openness of the initial structure of the problem. This was measured by calculating (based on timed photographs) the percentage of the elapsed time for the whole exercise used to composed the final structure with its essential elements. The lower this time, the sooner the structure of

the problem is set or "closed." In other words, "high openness" was characterized by a large proportion of time devoted to problem composition.

The second behavior observed was the amount of exploratory activity during the drawing stage. A higher score was given on this dimension if the subject changed paper or medium, or changed or rearranged the objects. The third behavior observed at this stage was the number of changes introduced in the structure or content of the problem while drawing. Higher scores resulted from behavior such as changing perspective, magnitude, or position and adding or deleting visual elements or objects in the drawing.

In addition to the two stages of observation, information was gathered at what was called the "solution evaluation stage" by questioning the artists when their drawings were finished. This focused on their concern for problem finding in general and each of the stages of formulation, solution, and evaluation.

Problem Finding and Creativity

At the conclusion of the study, each student's drawing was rated by five selected artists based on judgments of overall aesthetic value, originality, and craftmanship. The correlations between these ratings and the scores assigned to the problem finding variables observed in the experiment are reported in Table 7.2.

As can be seen in Table 7.2, judgments of overall aesthetic value and originality of the drawings are significantly related to problem finding behavior observed at the problem formulation stage and to the artist's reported concern with problem finding. Drawings of students

Table 7.2

Correlations between ratings on three dimensions of product evaluation and the problem-finding variable scores (Getzels and Csikszentmihalyi, 1976).

	Dimensions of Product Evaluation		
Process Variables	Overall Aesthetic Value	Originality	Craftsmanship
Problem Formulation (total score)	.40[c]	.54[b]	.28
Problem Solution (total score)	.26	.38[c]	.12
Concern with Problem Finding (total score)	.41[c]	.56[b]	31[d]
Total Problem Finding Score (grand total)	.47[b]	.65[a]	.31[d]

[a] $p < .0005$
[b] $p < .005$
[c] $p < .025$
[d] $p < .05$

who prior to drawing handled many objects, selected unique objects, and explored them in great detail were judged higher in originality and overall aesthetic value. The work of students who explored objects in greater detail was also judged higher in craftmanship. Since consistent relationships were found between behavior during the problem formulation and problem solving stages and the judgment of the quality of the product, the time spent on the arrangement and drawing task was calculated to estimate the effects of spending more time on the task. The results of this analysis showed that time spent on the problem formulation stage of the experiment was significantly related to the judged quality of the product (correlation with overall aesthetic value equals .46 ($p < .01$) and correlation with originality equals .53 ($p < .005$)). Time spent working on the drawing, however, was not significantly related to its judged worth.

Two general conclusions were put forth as a result of this study. First, problem finding (including the discovery, formulation, and envisagement of the problem that proceeds problem solving) is central to the creative process and is related systematically to the quality of the creative product. Second, a subjective concern for problem finding, especially at the problem formulation stage, is related to the originality of the product.

The results of this study support the notions of problem solving that ascribe importance to discovery, formulation, development of the problem. The influence of these processes has been shown in the work of Selz, Wertheimer, de Groot and others and has now been shown to be of central importance to more open, creative problem situations.

Teaching might be characterized as an instance of this latter problem situation (type-case 3 in Getzels and Csikszentmihalyi's problem situation classification), where only the general "dilemma" is passed to the teacher and he or she is responsible for formulating and developing the problem situation to the point where it can be dealt with by problem solving methods. If this is so, then planning becomes the major site for this process, and the characterization of planning as merely problem solving or decision making may overlook problem finding as a crucial and central function of the planning process.

Reasoning in Architectural Design

Introduction

In the introduction to this chapter, Simon's (1957 b) three phases of decision--intelligence, design, and choice--were described. It was said that most models of planning have emphasized the choice phase of decision to the neglect of the other two phases. Because of this, successive sections of this chapter have reviewed theories and research that have placed greater emphasis on the aspects of problem finding, problem formulation, and design. It is the purpose of this section to review research on problem solving and decision process in a task environment where design is the primary purpose. Architectural design has been chosen since a growing body of research has been developing since the early nineteen sixties to analyze and externalize the thinking processes of designers.

There is no clear distinction between the act of designing and the act of planning. Design has been defined as "to conceive the idea for and prepare a description of a proposed system, artifact, or

aggregation of artifacts" (Archer, 1970). This definition, though not mentioning planning, sounds remarkably similar to the definition of planning used in the present study. Other definitions are more explicit in their connections. For instance, design is "the act or art of making plans, schemes, patterns, (and) models" (Nadler, 1970). In architecture, design has been traditionally associated with the process of drawing up plans for a building. This was also the source for the traditional definitions of planning discussed in Chapter II. For all practical purposes, the words plan and design may be used interchangeably, and the only basis for distinction may be that design is preferred in architecture because of its popular connotation of being related to visual drawings, sketches, patterns, and blueprints.

The conception of the design process has changed radically with progress in the building industry. Traditionally, it was accepted that architectural design was composed of three design processes: (1) "disposition" (generally called composition), (2) proportion (i.e., study), and (3) construction (the execution of the design) (Gaudet, 1904). Even by the beginning of the twentieth century, the developments in building technology and programmatic requirements for building made the notion of developing and completing detailed "composition" prior to interaction and collaboration with engineers and contractors impractical and nearly impossible. More recently, the design process has been portrayed as a morphological and evolutionary process characterized by iterative and cyclical features.[14]

---

[14]See, for instance, the Royal Institute of British Architects' Handbook of Architectural Practice and Management, 1967.

As the research and theoretical focus has turned to the individual designer, design has been portrayed as a process of problem solving and decision making. The degree of rationality attributed to this process, however, differs widely across theorists. Jones (1970) describes these differences by grouping theorists according to three conceptions of the designer: the designer as magician, the designer as computer, and the designer as self-organizing system. The designer as magician refers to "black box" theorists who characterize the design process as a creative, "irrational" and partly unconscious process (e.g., Osborn, 1957; Gordon, 1961; Matchett, 1968; Broadbent, 1966).

The conception of designer as computer is based on the assumption that the design process is rational and explicit and that the human designer is able to operate with full knowledge of what he is doing and why he is doing it. In other words, the designer is portrayed as a human computer,

> ...a person who operates only on the information that is fed to him and who follows through a planned sequence of analytical, synthetic, and evaluative steps and cycles until he recognizes the best of all possible solutions (Jones, 1970, p. 6).

It is this approach that underlies nearly all of the computer simulations of design process, but it is also the process assumed by many to be operating in human designers (e.g., Archer, 1970).

The third approach, the designer as self-organizing system, is one proposed by Jones that falls between the "black box" and "glass box" theories. Jones sees both of these models as having the effect of widening the area of search for the designer beyond his capabilities and purposes. He replaces "blind" search of the alternatives with an "intelligent" search that "uses both external criteria and the results

of partial search to find shortcuts across unknown territory." This process is based on a notion of strategy control that accurately models the strategy itself and the external situation that the design is intended to fit. It is this last approach (designer as self-organizing system) coupled with elements of the first approach (designer as magician) that will be discussed in this section.

The peculiar mix of creativity and reason necessary for effective designing or planning is perhaps accurately captured by defining the process as a series of rationalizations, or as the father of modern architectural rationalism called them, "inspirations rigorously analyzed by reason" (Viollet-le-Duc, 1863). Thus, the designer first visualizes some relationship of forms (a problem) intuitively and then strives to justify it in relationship to the constraints imposed on the finished design. Collins (1971) characterizes this process as analogous to playing the role of all the participants in a legal trial:

> All the time design-decisions are being made, the architect must be the advocate supporting a particular solution, the advocate opposing this particular solution, the witnesses testifying both for and against its adoption, and the judge who makes the final decision (p. 81).

If this analysis of the design process is correct, then the crucial decision process in design is not that of choosing among alternative designs, but rather that of deciding whether or not to reject the design that one has visualized and formulated. In other words, the quality of creative talent may be measured by the variety of formulations that one is capable of thinking of, but the quality of decision making depends on the criteria that are used for rejecting an idea as undesirable or unworkable.

This formulation of the design process points to two basic activities whose description is crucial to an understanding of planning and design. The first is the "inspiration" or problem formulation process, and the second is the evaluation and solution process. Research and theory related to each of these processes will now be described.

Problem Formulations

Most problems confronting designers are what are called ill-defined problems (Eastman, 1969; Reitman, 1964; Simon, 1973). In these types of problems, no problem specification is given or agreed upon, no formal language with precise solution operations are available, and the goals to be achieved and the restrictions on the problem are open to interpretation. Moreover, no systematic test is available for deciding whether a form is acceptable as a solution. This type of problem is the same at Getzels and Csikszentmihalyi's (1976) "discovered" problem situations (type-case 3). In these situations, only the general dilemma for the design process is supplied, and it is up to the designer to discover and formulate the specific design problems.

The formulation of the problem provides three needed elements for the problem solver. First, it provides a design goal. This is usually in an ambiguous form similar to what de Groot calls a goal conception. This may involve general criteria that may be met by more than one design state or form. Second, the problem formulation defines the problem space in which the problem solver will search for a solution. The third element the problem formulation provides is the set of

criteria for judging a solution as workable. This is largely due to a specification of a "goal-as-attained" (a part of the goal conception).

In one of the few experimental studies of problem formulation, Baer (1976) defined the process as "mappings of an amorphous collection of different types of statements given by the task into a particular internal representation chosen at an early moment." The main task of problem formulation as he described it was to encode the goals of the task into an internal representation through processes of "recognition," "construction" and "adaptation." These processes take place in the following pattern. First, the designers search the problem to recognize possible goals. These goals may then be transformed to goals of a specific type (for example, goals expressed in spatial terms) and may then be ordered. Next, the primary goals are evaluated as suitable candidates for action (some type of initial design) and any preconditions, restrictions, and returns on action are calculated. If these are met and seem sufficient, initial designing ("construction") takes place. The results of the action are then incorporated into the problem space and a new state of the problem is present. Subsequent steps involve another cycle of defining goals, acting on them, and further transforming the problem. In this manner, the problem formulation process is made up of a step-wise filtering process followed by intermediate solving processes to delineate the problem further. Baer also found that designers "chunked" the problem to deal with parts of the design and used hierarchies in representations gradually to increase the detail of the formulation.

Overall, this process sounds very similar to the phase structure proposed by de Groot to describe problem solving, where thinking is

made up of an alternation between phases of direct analysis (elaboration) and phases involving integration, abstraction, and restructuring of the problem (goal). It may be that the processes involved in goal transformation and development during the problem solution stage are merely continuations fo the processes responsible for goal formulation in ill-defined problems. This argument will be pursued further in the next section on solving methods.

Solving Methods

There have been many more studies of the problem solution process in architectural design than of the problem formulation process (see Eastman, 1968, 1969, 1970 a, 1970 b, 1972, 1973; Henrion, 1974; Krauss and Myer, 1968; Mohr, 1972; Moran, 1970). Most of these studies have been detailed analyses of one or two designers solving architectural design problems or case studies of actual deliberations.

Most of these studies of the design process have emphasized processes of problem formulation and transformation. Eastman's (1970 a) study of space planning (arranging fixtures within a limited space to meet certain constraints) found design proceeding through steps of problem definition (including both goals and constraints) and problem transformation. This process was described as the production of a series of information states, where each new transformation requires a new operation. In another article (Eastman, 1970 b), these operations were described as search strategies incorporating either "generate-and-test" processes, "means-ends analysis," or "planning." These strategies will be taken up in more detail later in this discussion.

In a case study of design, Krauss and Myer (1970) found a similar process structure. They propose that the essence of the design process involves (1) the construction of forms relating to the relevant data and constraints, (2) the reevaluation of the problem and possible solutions in light of several different sets of criteria, and (3) reformulating the problem to correspond to this changing program (set of constraints). Rusch (1970) argues that this interplay of problem formulation and transformation can be explained in terms of productive and reproductive thought. By content analysis of a series of graphic representations (a series of lithographs of bulls by Picasso), he proposes that these two modes of thought play different roles in the design activity. Decisions derived through incremental activity (productive thought) function to clarify the form of the design (problem formulation) and decisions derived through reorganization (reproductive thought) function to keep the problem solver on course towards a final solution (problem transformation).

Processes of problem formulation and transformation have also been incorporated into computerized models of the design process. Moran (1970) proposes a model of the designer that uses different kinds of representation or language (systems of symbols and syntactic rules for generating well-formed statements) to express different aspects of the problem. The assumption is that as a designer thinks of a problem in different ways, different slants or problem formulations may be generated. To be useful, these different languages must be based on information already in memory so that there can be a mapping of symbols onto concepts in memory. An additional assumption of the model is that problem representations are primary influences on

problem solution since operations performed on different representations are the primary sources of new information. In this manner, the problem formulation stage is integrated with the problem solution stage by processes involving representation --→ operation --→ reformulation.

In his PSP (Problem Solving Process) model, Manheim (1970) distinguishes between processes that generate actions and processes that choose among them. This first process is called search, and the second process is grouped into three operations--prediction, evaluation, and choice. At the heart of his model is a goal formulation and revision process similar to those mentioned earlier. As new actions are generated (through search), they are examined and evaluated usually resulting in a modification of the goal. Thus, the analysis proceeds as a parallel evolution of a set of actions and a set of goals until a satisfactory design is reached.

Three search strategies are proposed by Eastman (1970 b) as characteristic of problem solving in architectural design. The first, "generate-and-test," involves trying every possible alternative until one is found that is satisfactory. This is considered to be an algorithmic method (that is, it guarantees an eventual solution) and has been shown to model the decision processes of some designers in simple situations or at the beginning of a solution sequence (Eastman, 1969).

Means-ends analysis is a common decision process which relates possible operations (means) to criteria or goals to be achieved (ends). In its most common variant, means-ends analysis is applied to an alternative generated by some other strategy. It can also be used to

identify appropriate operations for generating the initial operation (see Eastman, 1970 b, for further discussion of these two variants). Means-ends analysis has been found to be a common heuristic process in design problems and is included as part of more complex search strategies.

One such strategy, and the third strategy discussed by Eastman (1970 b) is "planning." Planning as a search strategy has the following qualities:

1. The problem structure is analyzed to find those elements that are most closely related (subsets of the problem).

2. Planning involves search of an abstract problem space to provide a guide for problem solving. This guide functions by structuring the problem based on one type of relation (problem representation).

3. The search strategies for solving the limited relationships of the problem considered in planning are the same as those used in other apsects of design. This includes generate-and-test, means-ends analysis, and even planning (itself).

4. Once the planned aspect of the problem is resolved, it is used as a guide to generate the fully specified problem (paraphrased from Eastman, 1970 b, pp. 145-147).

Eastman also discusses two types of planning. "Bottom-up" planning involves the aggregation of the basic elements of the design until the single design unit at the top is reached. In most cases of design, however, this situation does not exist. What is usually known is the complete design unit (the general problem) at the top of the theoretical hierarchy. The second mode of planning thus becomes the decomposition of the problem from the top-down. "Top-down" planning is the typical situation facing designers. It is primarily based on past experience, and, because of this, it has been criticized. Since

in reality, experience is not based on a complete analysis of aggregations of activities, the basis for a specific composition cannot be validated. To remedy this problem, Alexander (1964) offers an alternative procedure for decomposition and Eastman (1970 b) argues that for any well defined system, there are procedures available for aggregating basic elements in a "bottom-up" manner. To summarize, planning as a search strategy provides a method for delimiting the combinatorial possibilities of a problem. By factoring out for preliminary analysis critical aspects of the problem, it focuses on particular problem representations that are most likely to provide a solution.

In concluding this section, two additional aspects of the design process that have shown up in research should be mentioned. Throughout this discussion, the crucial role that problem representation and formulation plays in the design process has been emphasized. It has been repeatedly implied that the greater the ability to create different representation the more productive is the design process. The importance of multiple representations of the probelm has been further illustrated by Eastman's (1970 a) study of space planning. There he found a clear correspondence between the kinds of constraints considered by a designer and the representations used. Thus, more successful designing was accompanied by a greater variety of ways of representing the problem. This implies that more effective design (or planning) may be facilitated by representing the problem in a variety of ways such as words, numbers, flow diagrams, sections, perspectives, and plans. It is still unknown, however, whether this use of multiple representations may be facilitative in design activities that are not of such a visual nature as architectural design.

Another aspect of the design process touched on in this section is the effect of past experience (or reproductive thinking). It was implied that aspects of the design process such as representation have a base in memory. The exact role that experience plays in the effectiveness of the process has not been thoroughly studied. One finding that supports the importance of experience was also reported by Eastman (1970 a). He found that those designers who relied upon direct retrieval from memory for generating problem constraints were more effective ("far superior," in his words) designers than those who relied solely upon external cues for generating constraints. Although most of the designers seemed to generate constraints randomly from memory, some were found to have highly organized lists that were applied to specific aspects of the problem. These results seem to indicate that the reason more experienced individauls are more effective in this type of task is because they bring more information into the situation and are less at the mercy of the task for providing cues.

Summary

This section has looked to research and theory in the area of architectural design to provide further insight into the aspects of problem solving referred to as design or planning. Design has been portrayed as an evolutionary process characterized by interative and cyclical features. The design process has been described as a peculiar mix of creativity and reason involving a series of "inspirations rigorously analyzed by reason." It has been proposed that the crucial decision or judgment process is rejection of unworkable alternatives rather than choice among several alternatives.

Two basic processes of problem formulation and problem solution have been discussed. The research seems to indicate that the distinction between the two may not be psychologically meaningful since both processes seem to be characterized by a series of problem formulations, solutions, and problem transformations. As such, the design process is quite similar to the problem solving processes proposed by Selz, Bahle, and de Groot. Three search strategies that are common in design were described with special emphasis on planning as a search strategy. Finally, research findings were reported fortifying the theorized importance of multiple representations of design problems and of information, representation, and strategies brought to design problems by experienced practitioners.

In the next chapter the theory and research in the areas of problem solving, problem finding, and design will be combined with empirical observations from this study to formulate a theoretical model of the planning process.

CHAPTER VIII

THE PSYCHOLOGY OF PLANNING II: A PROCESS MODEL OF TEACHER PLANNING

Introduction

Toward a Theory of Teacher Planning: the Model's Purpose

The ultimate aim of research on teaching should be the development of models and theories to:

1. Provide the most parsimonious summary of actual or anticipated research findings,
2. Coordinate research so that many separate findings support each other,
3. Locate the most strategic or manageable propositions for testing, and
4. Provide a limited area in which to locate false propositions, when a hypothesis fails to meet an empirical test (Zetterberg, 1965, pp. 161-166).

In addition to the description of one teacher's planning, it is a purpose of this study to formulate a general model of teacher planning that may serve functions similar to those mentioned by Zetterberg.

As Snow (1973) suggests, there appear to be almost as many definitions of theory as there are people concerned with theory. Snow defines six different levels of theory ranging from formal axiomatic theories to the development of formative hypotheses. For the purposes of this study, theory will be defined it its simplest sense--as a symbolic construction designed to bring generalizable facts into

systematic connection (Snow, 1973) or as Zetterberg (1965) defines it--an interrelated set of propositions.

There are almost as many definitions of model as there are of theory. The word model has been used interchangeably with theory at one definitional extreme and has been used to refer to a deductive system constructed to interpret the calculus of a theory at the other. In this chapter, the term will be used to refer to a system of relationships used to promote theorietical development. To be more specific, a model will be defined as a well developed descriptive analogy that functions to help visualize phenomena that cannot be easily or directly observed (after Snow, 1973).

Using these definitions, the possibility of developing a model of teacher planning seemed within closer reach than a theoretical representation. Given the lack of previous theorizing on teacher information processing, a sufficient set of propositions about planning or decision making is not yet available to attempt the development of a formal theory. In light of this situation, a model of teacher planning is the first step towards theory development. The purpose of this chapter is to set forth a general model of teacher planning. This constitutes a first attempt at relating the various components of the planning process, and its purpose is to promote theory development by generating hypotheses about teacher planning.

One way to characterize this model further is to indicate what it is not intended to be. First, it is not intended to be a specific representation of Mrs. Lisa's planning. Her planning was one source of data for developing the model, but not the sole basis. Her planning can be represented by the model, but the specifics of her

deliberation are not represented in detail. Thus, rather than being a model of an individual teacher, speculations about teacher planning in general are presented.

Second, the model is not intended to be a complete and detailed picture of the planning process. The major components of the planning process indicated in this and other planning studies are included in the model; however, it is possible that there are other important factors that have been overlooked. In the same manner, the temporal and interactive relationships between components (indicated by connecting arrows in the illustrations) are not meant to exhaust all the important relationships in the planning model. Also, no effort has been made in many cases to describe in detail the processes indicated by all the arrows in the model. In short, the following discussion is the result of efforts to generate a general model of teacher planning for the purpose of moving from descirptions of planning toward a theory of the teacher planning process.

Grounding of the Model

Glaser and Strauss (1965, 1967) distinguish between formal theory based on logical specualation and "grounded" formal theory based on data. Before describing the process model of teacher planning, this section will describe the data base or the "grounding" of this model.

Three sources of data serve as the basis for this model. The first source is the description of Mrs. Lisa's planning put forth in this study. This includes descriptions of the task environment for her planning and teaching, her goals, and her general behavior in the teaching environment. This information is similar to that suggested

by Newell (1973) for studying human information processing. He proposes that to describe the methods a person is using to solve a problem or make a decision, one must have information about (1) his goals, (2) the structure of the task environment in which he is functioning, and (3) the invariant structures of his processing mechanisms. For the purpose of this study, it was assumed that Mrs. Lisa was constrained by the same process limitations found to be characteristic of other problem solvers, namely, serial information processing, limited short-term or "working" memory, relatively long time required to transfer information from short-term to long-term memory, and so forth.

The task environment for teaching was described in Chapter IV and was characterized by complexity, unpredictability, immediacy, simultaneity, and multidimensionality. Furthermore, the planning environment was portrayed as relative "ill-defined," with few specific guidelines or prepared materials in many subject matter areas. The third piece of information suggested by Newell, Mrs. Lisa's goals for teaching and planning, was described in Chapters IV and VI.

The "methods" arising from these descriptions were discussed in Chapter V and focused on Mrs. Lisa's teaching by activities and with routines. The "methods" used for planning also became more visisble as a result of describing the task environment and goals for planning. Planning was observed as taking place at successive levels of comprehensiveness and detail, at different times during the year or term, and in various forms (Chapter VI). Mrs. Lisa's planning process was also observed as being characterized primarily by decisions focusing on the formulation and elaboration of instructional activities over time.

By the end of the field research, many things were known about Mrs. Lisa's planning. It was known that most of her planning focused on instructional activities. Many of these activities were well routinized, and by winter term Mrs. Lisa's planning time was taken up by planning for social studies and science units. Mrs. Lisa's planning could be described at five levels and each level could be distinguished in terms of goals, information used, the form of the plan, and the criteria for judging planning effectiveness. Also, choice (the selection among alternatives) was not a prominent activity in Mrs. Lisa's planning. Rather, it was characterized by the development and elaboration of activities over time. Furthermore, this elaboration took place as activities passed from general to more specific levels of planning. Also prominent in Mrs. Lisa's planning was her reliance on past experience--what seemed to work well or didn't work with previous classes.

The second source of data for this model came from other studies of teacher planning. Although these studies are few and somewhat limited, sone of their findings agreed with those of the present study. Two findings of special interest to this model were the failure to identify objectives as a primary object of teacher decision making during the planning process (Zahorik, 1975; Peterson, Marx, and Clark, 1977) and the lack of well developed alternatives in teachers' plans (Morine, 1976). Both of these findings support the notion that teacher planning in practice is not characterized by processes advocated by the rational planning model. Rather than being dominated by decisions about objectives and alternatives, these studies indicated a greater concern for content and activities.

The third source of data for the model of teacher planning came from research on deliberative thinking processes from fields outside of education. (This research was described in Chapter VII.) The basis for the utilization of this data as a source for the model is "theory translation" (Snow, 1973). Theory translation is the process of borrowing or substituting a theory or part of a theory based on analogies between two situations. The similarities among the situation in teacher planning and those of selecting a move in chess, composing a musical or visual composition, or planning for space utilization in a building suggested the usefulness of adopting concepts from research on these latter processes.

The test for the usefulness of theory translation is that the translations suggest new hypotheses which would not have been otherwise available (Jacobson, Stimart, and Wren, 1971). In this model, theory translation has made two major contributions. First, it provides some of the terminology for processes in the model (e.g., problem finding, problem formulation, goal conceptions). Second, the more detailed, controlled studies by these researchers supplies more detailed descriptions of decision processes not directly observed in this study. Both these contributions to the model pass the test for usefulness of theory translation by providing the model with concepts and terminology that suggest a similarity of process in teacher planning of art, design, chess, and musical composition. By supplying the model with more detailed process descriptions, theory translation has also added to the detail of the theoretical model which, in turn, may promote more detailed and specific hypotheses to be tested in the future.

General Features of the Model

The Model's Focus

The purpose of this model is to provide a theoretical description of the decision processes involved in teacher planning. The focus of the model is on the individual, preactive, deliberative information processing involved in planning from an initial idea to its implementation. Planning in the preactive stage of teaching was chosen since it is the site of most instructional planning. The focus of the model is on the processes of planning in order to shed light on possible methods used by teachers in their planning. The lack of knoweldge about mental processes involved in actual planning (discussed in Chapter II) makes the need for such a description apparent.

This model purports to describe the planning process in general. Within the framework of the process, there are many judgments and decisions that will not be described or modeled in detail. Most of these activities occur during the design stage of the model and include judgments about grouping, selection of materials, schedule revision, and so forth. These judgments are not modeled since their representation would be an enormous task and is beyond the scope of this chapter.

There are two major types of planning decisions not discussed in the context of this model. The first are those planning revisions that take place in the interactive teaching setting. These decisions were excluded because they were not observed in this study (see note ten, page 169) and because a majority of the other work on planning has focused on deliberation in non-interactive situations. The

second category of excluded decisions are group planning decisions such as those made in team-teaching situations. Since these situations greatly complicate the process by the addition of social variables such as power, conflict, and conformity, and since these types of decisions have not been examined by this or any other study of teacher planning, these decisions are also not a concern of this model. In short, this model focuses on planning processes most central and dominant in teaching, namely, individual, preactive planning.

Purposefulness and Rationality

Herbert Simon stated that behavior is purposeful in so far as it is guided by general goals or objectives and that it is rational in so far as it selects alternatives that are conducive to the achievement of previously selected goals (Simon, 1957 a, p. 5). Using this distinction, decisions observed in this and other studies of teacher planning may be called purposeful, but may not necessarily be called rational.

In Chapter II, the rational model of planning was described. Like all rational decision making models, it requires:

1. The setting of goals,
2. The formulation of alternatives,
3. The prediction of outcomes (consequences) for each alternative, and
4. The choice of one alternative based on its outcomes and relation to the goals.

Mrs. Lisa's planning deviated from this process at each step. Goals were not always explicitly stated in advance or as the first step in planning. Alternatives were rarely formulated in detail with the

consequences laid out for each alternative. Because of this, there was little opportunity for choice among alternatives based on their outcomes and relationship to her goals.

Obviously, the rational model of planning was not the process followed by Mrs. Lisa in her planning deliberaticns. This was not surprising, since the rational model has not been shown to be characteristic of practitioners in other studies of planning in the field. In Chapter II, the failure of the rational model to accurately describe the planning process was illustrated in studies of urban and national planning. The few studies of teacher planning reviewed in the same chapter also cast doubt upon the accuracy of this model. Zahorik (1975) found decisions about objectives to be reported less frequently than decisons about pupil activities or content and concluded that teacher planning does not seem to flow logically from objectives as the rational model proposes. Peterson, Marx, and Clark (1977) also found thinking about objectives to be conspicuously absent. In their study, most of the teachers' time was spent thinking about content and activities and only .04 percent of their time was spent on objectives. In addition to a low emphasis on behavioral objectives, Morine (1976) found a lack of well developed alternatives as a product of planning. This finding casts doubt on another aspect of the rational model, namely, the formulation of alternatives.

It is likely that the rational model breaks down in all of these instances for the same reason. Its assumptions regarding thes stability and predictability of the environment, the amount of knowledge available to the planner, and the information processing capabilities of the individual planner are all violated. If planning in practice

has not proved to be oriented towards goals, alternatives, and choice, what are its basic characteristics? One way to describe them is to discuss the planning process within the context of the three phases of intelligence, design, and choice proposed by Simon (1957 b).

Intelligence. Simon referred to intelligence as those processes for scanning the environment to see what matters require decision. Getzels and Csikszentmihalyi (1976) refer to this process as "problem finding." In many decision making situations, the problem or the decision to be made is well defined and stated. In planning situations, However, this is typically not the case. Planners are often charged with laying the framework that will serve as a guide for future action and decision making. For this reason, planning tasks are often stated in general yet comprehensive terms. For instance, city and national planners are confronted with such tasks as, "Develop a comprehensive plan for urban renewal in the downtown area," or "Construct a plan for famine relief in this Asian country." Teachers are confronted with similar situations, though their planning may be more in response to the requirements of the teaching environment (e.g., "The kids are coming next week; what will I do?") rather than in response to a directive to plan from the principal or school district.

This open-ended, general task definition which often confronts planners requires that they not only be good problem solvers, but also good problem finders. Good and creative planning is as much a result of skill and experience in defining and discovering the crucial aspects in the general planning "dilemma" as it is a result of problem

solving ability. For this reason, problem finding processes are emphasized in the first part (Stage I) of the model.

Design. Simon defined design as the proceses for developing and examining possible courses of action. In the rational model, this would be the process involved in the formulation and evaluation of alternatives and their outcomes. In many planning situations, however, the resources and energy for laying out a number of well developed alternatives are not available. Much more typical of planning and design is the formulation and development of one alternative until it is acceptable as a solution or until it is rejected as unworkable. This process may also involve the modification of one's goals as further elaborations shed light on the feasibility of the desired end-product. Thus, problem solving goes hand-in-hand with problem formulation and the final goal often does not emerge until the final solution is achieved.

Using this notion, design is not a preliminary step to choice or decision, but is the heart of the problem solving process. Since much of the planning behavior observed in this and other studies seemed to conform to this notion, a central part of the model (Stage II) is devoted to portraying this process.

Choice. According to Simon, choice is the process of choosing among courses of action. It is this process that is at the heart of the rational decision making and planning model, and it is here that good or bad decisions are made. Because of the importance of choice in

the rational model, this process has been the focus of most research and theory in decision making.

Choice among alternatives was present in Mrs. Lisa's planning, but it was by no means the focus or the cumulation of the planning process. When planning for activities, Mrs. Lisa often chose among ideas or materials, but this was primarily in the problem finding stage of planning and was only an initial step in planning. Choice seemed to be functioning in a similar manner in the studies reviewed in Chapter VII. For this reason, choice plays only a subsidiary role in this model of teacher planning.

Design or Decision?

The relative emphasis of this model across Simon's three phases of decision raises the question of whether or not planning as observed in this study is a "decision making" process. It involves the three phases of decision; however, the emphasis of the process is not on choice but on problem finding and design. Given this emphasis, planning seems much more akin to problem solving than to decision making. Problem solving implies the goal directedness and purposiveness of the process, but does not imply that a solution will be arrived at through choice.

In the broad sense, planning may be referred to as decision making since one often speaks of "deciding on a solution" regardless of whether the solution was arrived at through a process of choice or "design." In the same manner, one would not say that the planning described here is irrational because it does not conform to the rational model. This model of planning may involve as much reason and

understanding as other rational processes, and is a specific case of what Simon calls limited or "bounded rationality."

Although the distinctions among decision, problem solving, rationality, and purposefulness are not always necessary or useful, they will be retained here as a means for more precisely describing the planning processes. Using these terms, this model is a description of planning as "purposeful problem solving" (or design) as opposed to planning as "rational decision making."

Outline of the Planning Model

The general process model of teacher planning is illustrated in Figure 8.1. The model portrays three stages:

Stage I - Problem Finding

Stage II - Problem Formulation/Solution (Design)

Stage III - Implementation, Evaluation, and Routinization

Stage I is the first step in planning. It is here that the general planning task is translated into a specific planning problem. The major process at work in this stage is the "discovery cycle." This is the process through which problem finding occurs and involves the interactions among the planning dilemma, teaching goal conceptions, knowledge and experience, and materials. The product of this cycle is an "initial problem conception" to be further elaborated in the problem formulation/solving stage.

Stage II is where most of the planning energy and time is invested. The primary process of interest in this stage is the "design cycle." It is through this cycle that the initial activity idea is repeatedly elaborated and tested until a satisfactory solution is found.

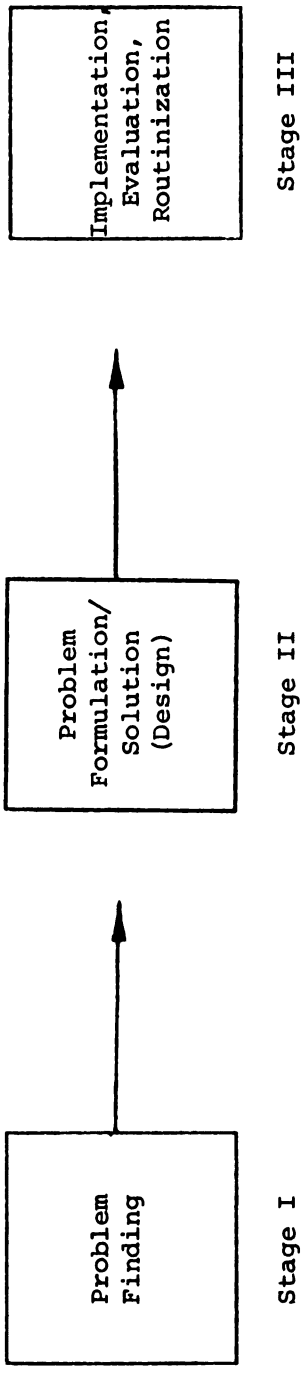


Figure 8.1 Stages of the Planning Process

Stage III is where the activity is actually implemented and evaluated in the classroom. This stage provides the teacher with information on the workability of the activity with one's group of children and may lead to further modification or even rejection of the activity. If an activity is successful, it may eventually be routinized. Experience with both successful and unsuccessful activities and routines eventually is fed back to long-term memory where it becomes part of the repertoire of knowledge and experience used in future planning.

These three stages of planning characterize the teacher planning process "from idea to implementation." The remainder of this chapter will be devoted to describing and discussing in turn each of these three stages and their respective processes.

Problem Finding

Introduction

It is usually the case that if one observes two teachers at the same grade level in the same school, their classrooms will look different. So will their teaching and planning. This characteristic of American schooling attests to the "openness" of the teaching task that confronts most teachers. Even in school districts such as Mrs. Lisa's where exhaustive and detailed objectives are provided along with prepared programs for teaching some subjects, large variations still exist. The freedom and responsibility for molding a program of instruction geared to a unique set of students is primarily in the individual teacher's hands. This unspecified teaching task or "dilemma" requires, as has been said earlier, that a teacher be as good a "problem finder" as a problem solver.

In this model, problem finding refers to the process of becoming aware of what specific problem needs to be solved within a general, non-specified problem situation. In the context of planning, problem finding refers to the "discovery" of a potential instructional idea that requires further planning and deliberation. This idea is referred to as a "problem" since at this stage in planning it is still not known if this idea can be realized in the classroom and, if so, how it will be done. Since the instruction in Mrs. Lisa's classroom centered on activities, the "problems" that surfaced in her problem finding were usually ideas for activities. Other "problems" that might be dealt with during this stage include plans themselves or specific lessons.

Figure 8.2 illustrates in more detail the processes involved in problem finding. Here problem finding is portrayed as involving interaction among the planning dilemma confronting the teacher (arising from the general teaching dilemma), teaching knowledge and experience, teaching goals, and the teaching materials available. The sensing, searching, generating, and manipulating of ideas based on these elements is referred to as the discovery cycle. The result of this cycle is the statement of a problem (idea) in the form of an "initial problem conception" which becomes the basis for further elaboration (planning). Each of these components of problem finding will now be discussed.

General Teaching Dilemma

The characteristic of ill-defined or "discovered" problem situations is that the problem to be solved is not presented and defined for the problem solver; only the general task or "dilemma" is

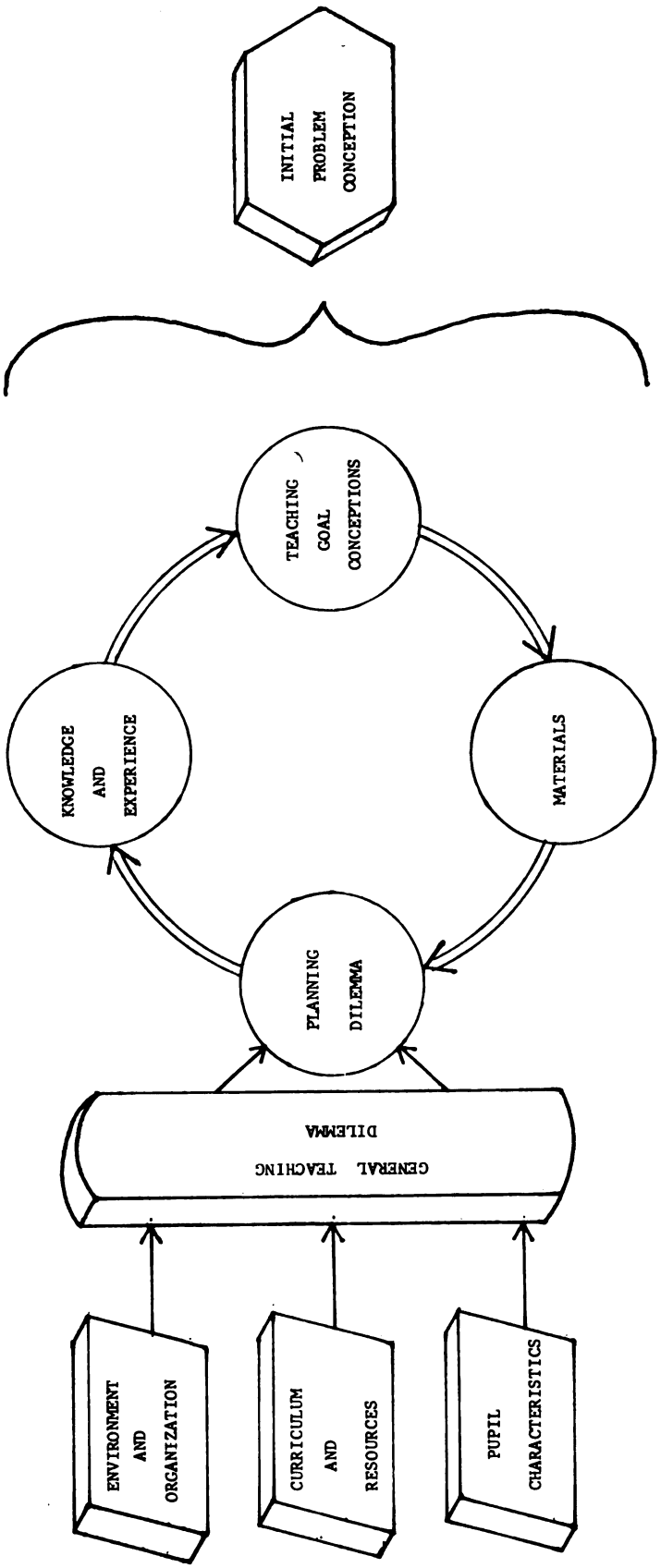


Figure 8.2 The problem finding stage of teacher planning.

presented. The general task for teaching is represented in the model by the "general teaching dilemma." One way of stating this dilemma is, "Here is your classroom; here are your students; teach them." Although this is obviously an oversimplification, it may be closer than one thinks to characterizing the "openness" in many teaching and planning situations.

The model portrays three major influences contributing to the general teaching dilemma. The first is the teaching environment and its organizational influences. This includes the physical characteristics of the classroom and the school, and also organizational factors that influence such things as whether or not a classroom is self-contained, whether or not it is "split" across grades, and the number of students in the class. The length of the school day and the length of lunch and recesses are also included under organizational influences. Relationships with the principal and with other teachers are further factors shaping the environment for teaching.

The second major influence on the general teaching dilemma is the curriculum and resources available for teaching. This involves the curricular guidelines inherent in school or district objectives and in student evaluation forms. It also includes programs, kits, and materials supplied to the school for teaching certain subjects, resource teachers available for teaching in certain subject matter areas (e.g., art or music), and aides available for helping in the classroom.

Pupil characteristics are the third major influence shaping the general teaching dilemma. Influential characteristics include pupil background factors and judgments of student ability, maturity, attention span, ability to work as a group, and so forth. A detailed

description of each of these three major influences in Mrs. Lisa's classroom was presented in Chapter IV.

The Discovery Cycle

The fact that teachers vary in the materials and activities they use in their classrooms even at similar grade levels in the same school raises the question of where ideas and activities come from. If they arise solely from the general teaching dilemma confronting them, it would seem likely that teachers in similar situations would be teaching in similar ways.

The discovery cycle is a means for accounting for the uniqueness and originality of teaching. It does this by including in problem finding four other components: the "planning dilemma," teaching knowledge and experience, "goal conceptions" of teaching, and teaching materials. One of the components (materials) is "outside" of the planner as part of the teaching situation; the other three (planning dilemma, teaching goal conceptions, and knowledge and experience) are within the planner. Problem finding arises out of the interaction of these four components.

Planning dilemma. The planning dilemma is created as a direct outgrowth of the general teaching dilemma. As soon as one begins to explore the general teaching dilemma, one finds that it is characterized by complexity, immediacy, and unpredictability. (See Figure 1.1 and the accompanying discussion.) These factors make planning a near necessity, and it is out of this need that the planning dilemma is formulated. The planning dilemma might be stated in its most general form as, "I've got to plan for this unit (or activity, lesson, etc.)."

The specificity of the planning dilemma may change as planning proceeds over time. In Mrs. Lisa's planning, changes in specificity of the planning dilemma are most obvious across the levels of planning discussed in Chapter VI. Using social studies as an example, the planning dilemma at the yearly planning level might be phrased as, "Plan for social studies." At the unit level, it might be more specifically put in the form, "Plan for the nutrition unit," or more specifically, "Plan for an activity using the four basic food groups." In this manner, the planning dilemma frames the problem finding process at various levels of specificity. This might be described in information processing terms as a way of establishing the "problem space" for problem finding. It may also be that the establishment of the planning dilemma is one of the functions of the executive planning routines mentioned in Chapter V.

Teaching goal conceptions. Teaching goal conceptions are one of the two goal components in this planning model. The other is the total problem conception that is part of the design cycle in the problem formulation/solution stage. Both of these terms are modeled after de Groot's notion of "Total Goal Conception: which refers to a problem solver's anticipatory conception of the solution to the problem, or the "goal-as-attained." It includes all features of the goal and the problem which are important to the problem solver at a given point in the thought process.

The total goal conception was chosen as a model for the goal components in planning for several reasons. First, the schematic, incomplete character of the total goal conception that is gradually modified and elaborated during problem solving processes seemed accurately to capture Mrs. Lisa's orientation towards goals and objectives in planning. Goals were not set in advance with subsequent planning striving to achieve them as fully as possible. Neither were goals or objectives written out at any level of Mrs. Lisa's planning for activities. Rather, initial goals, when elicited, were stated in vague, general terms such as, "I'd like to use these books for a creative writing activity," or "I want to do a social studies unit on Japan." A similar orientation towards goals and objectives was also indicated in planning studies by Morine (1976), Peterson, Marx, and Clark (1977), and Zahorik (1975).

The second reason for using total goal conception as a model was its comprehensiveness. Using de Groot's definition, total goal conception not only refers to the state of the main problem at a given time, but also contains anticipations concerning difficulty and solvability of the problem, methods possibly applicable to solution, as well as notions of intuitive or emotional preference and dispositions or motivations toward solving the problem. In short, the total goal conception includes both cognitive and affective expectancies for solving the problem.

This comprehensiveness is theoretically important because it broadens the notions of goals in planning from a purely cognitive base to an intuitive and emotional base as well. Also, it incorporates

a dynamic, motivational element into the model in terms of expectancies and anticipations to realize the total goal. It is reasonable to assume, for instance, that the nature of goal and problem conceptions and the constant interaction with them is a potent force in fueling the planning process.

The third reason for modeling total goal conception is also theoretical. De Groot operationally defined the total goal conception of a problem solver at a certain moment in the process of though as, "The answer he would provide if interrogated at that particular moment about his total goal conception" (1965, p. 75). Thus, the state of development of the total goal conception may be approached by stopping and questioning the problem solver at any random moment in the process. As de Groot acknowledges, this places a burden on the subject to introspect about his total goal conception, and the detail and accuracy of the report may depend on one's skill in introspection. Recent critics of introspection (e.g., Nisbett and Wilson, 1977) might further argue that this method will result in a subjective "plausible theory" about the state of the total goal conception rather than its actual condition. Putting these arguments aside for the moment, the notion that the total goal conception is accessible in thought may mean that it could be tapped using methods such as "thinking aloud" which rely to a lesser extent on the problem solver's thinking about, judging, or theorizing about his own thought process. In fact, de Groot suggests that a more concrete way of determining the total goal conception at a given point might be to collect outlines, sketches, notes, and other work already completed. (Although no systematic and formal methodology was used, it was through this method--along with thinking aloud--that many of

the features of Mrs. Lisa's planning described in this study were first suggested.)

With de Groot's total goal conceptions as a basis, teaching goal conceptions in this model refer to anticipatory conceptions of what effective teaching would look like for a specific group of students. This includes conscious, explicitly stated goals and objectives (both cognitive and affective). It also refers to vague intuitions, disposition, or attitudes toward teaching that one may possess. In short, teaching goal conceptions include all the conceptions and anticipations --cognitive and affective, conscious and unconscious--about what it means to teach a specific group of students successfully. During this study, there was no systematic procedure for eliciting these goal conceptions; however, Mrs. Lisa's stateable goals were collected and are described in Chapter IV.

Teaching goal conceptions (along with the knowledge and experience component of the model) serve as a guide to the problem finding process. They shape the sensing, searching, generating, and manipulating activities of the process by acting as a filter for problem conceptualization. Creative processes such as problem finding necessarily involve a lowering of barriers to innovative and unusual interaction of thought elements. This is a prerequisite to and a main feature of idea-generating activities such as "brainstorming." But since problem finding is a directed problem conceptualization process taking place within a certain planning dilemma, this barrier lowering must be accompanied by some mechanism for screening those problem conceptualizations that are not worthy of further elaboration.

Within any planning dilemma there are an infinite number of potential problems (ideas, activities) that might be elaborated into instructional activities; not all of them, however, contribute to the instructional process as conceived by the teacher. Teaching goal conceptions contribute to the screening of problems by insuring that only problems with potential contribution to the completion of teaching goal conceptions reach the level of "initial problem conception."

Earlier in this section, it was suggested that the incomplete, anticipatory character of the goal or problem conceptions suggests a motivational role for teaching goal conceptions. If this is so, then teaching goal conceptions "fuel" the problem finding process in addition to guiding it. The incomplete nature of the teaching goal conceptions creates a "disposition" similar to the "gap" and "tension" inherent in Selz's schematic anticipation. Getzels and Csikzentmihalyi suggest a further motivational factor that is most likely seated in the teaching goal conception. They propose that "creating order where none exists" is a general motivating factor for problem finding. It has been suggested in earlier chapters that Mrs. Lisa's high "need" for order was a major factor behind her planning. It may be that dispositions similar to this function as motivational factors in problem finding.

Knowledge and experience. De Groot summarizes a discussion of ability in chess playing in chess by stating that:

> ...a master is a master primarily by virtue of what he has been able to build up by experience; and this is: (a) a schooled and highly specific way of perceiving, and (b) a

> system of reproductively available methods, in memory (p. 308).

The influence of this "treasury of ready experiences" plays a major role in the functioning of experienced practitioners;[15] however, the role of experience has been studied rarely in the context of decision making and almost never in the context of planning.

De Groot suggests two aspects of experience that may be important to teacher decision making in general and teacher planning in particular. The first is the development of specific ways of perceiving the teaching and planning dilemmas. This skill is particularly important in a visually spatial and geometrical game such as chess, but it is important in all forms of problem solving. Experience makes possible and increases the use of "immediate means abstraction" as described by Selz, where one immediately abstracts ("sees") from the structure of the situation what is going on and what needs to be done. It may be that the experienced teacher can perceive some logical or causal structure in a teaching or planning problem that is not apparent to the layman or the novice pratitioner. This specialized way of "seeing" may also be an important factor in discovering certain features or possibilities in problem finding situations. In this sense, problem finding may involve "reproductive" factors in what is primarily thought of as a creative, productive endeavor.

The second aspect of experience suggested by de Groot is more obviously reproductive. This is the storehouse of "methods" available in memory. This involves both knowledge of specific means-ends

---

[15]See, for instance, Chase and Simon's (1973) research extending de Groot's work on chess perception.

relationships and a repertoire of problem solving and problem finding methods. The greater this repertoire of knowledge and experience, the less dependent the problem solver is on the problem or dilemma to provide information. Because of the wealth of knowledge brought into the problem situation, the experienced practitioner can rely on "routine actualization" while the less experienced individual must build the problem from the ground up.

Available in memory are both knowledge and intuitive experience. Both are the result of learning processes, but they differ in that knowledge can be explicitly stated, whereas intutitive experience cannot. De Groot distinguishes the two elements by stating that knowledge (knowing that...) can be explicitly formulated and is retrievable from memory by verbal cues, whereas intuitive experience (knowing how...) is only actualized by situations where it can be used. De Groot concluded from his study of chess mastership that "the differentiated system of thought habits" (routines) possessed by good players consists partly of knowledge, but largely of intuitive experience. These findings suggest that intuitive experience may also play a central role in teaching mastership.

The persistent referral to "what works," "what happened last time," "what went wrong last year," and other such statements pointed to the importance of knowledge and experience in Mrs. Lisa's planning. In the planning model, knowledge and experience are included as a central component in both the problem formulation/solving stage and the problem finding stage. Three major roles are proposed for knowledge and experience in problem finding. First, they provide a repertoire of activities, routines, and ideas to serve as a basis for the initial

problem conception. In this manner, memory serves as an internal source of planning problems. For example, it was common for Mrs. Lisa to search through her materials files for an activity or worksheet she remembered was successful last year. Often in term planning, whole activity routines were recalled to use with this year's class. This influence of experience on problem finding was especially apparent when looking through Mrs. Lisa's plan books from the two previous years, since many current activities were modeled after those used in the past.

The second role knowledge and experience play in the discovery cycle is directive. They provide guidance to the methods of problem finding by means of executive planning routines. Although these routines should be more obvious in the design stage of planning, it makes sense theoretically to propose that as a result of experience these routines guide the problem finding process as well. It is proposed that this guidance takes place through the introduction of methods for sensing, searching, generating, and manipulating problems during the discovery cycle. Specific problem finding methods were not directly observed during this study, and to date, there have been no specific studies of problem finding methods. Because of this, the model goes only so far as to propose that problem finding primarily involves the sensing, searching, generating, and manipulating of problem conceptions; that these problem conceptions originate chiefly from knowledge and experience and teaching materials; and that they are generated in the context of a specific planning dilemma and the teaching goal conceptions.

The third role knowledge and experience play in the discovery cycle is evaluative. As mentioned earlier, knowledge and experience function along with the teaching goal conceptions as a filter for potential problem conceptions. An idea may not reach the level of initial problem conception because it does not contribute to the completion of the teaching goal conceptions. It may also be rejected if the idea has already been tried and has failed. Rejection for the latter reason is lesson common than for the former reason since the planning dilemma and teaching goal conceptions are constantly changing and evolving. An idea may have failed in a previous situation, but may be entirely feasible in the present one.

To summarize, knowledge and experience are portrayed in this model as involving: (1) learned and specific ways of perceiving a problem situation, and (2) a system of reproductively available knowledge and methods in memory. In problem finding, knowledge and experience provide a repertoire of ideas (problems) that may serve as a basis for initial problem conception, influence the direction of the problem finding process by means of executive planning routines, or provide a further screen to potential ideas by comparing them with the success or failure of similar ideas in the past.

Materials. The fourth major component of the planning cycle is materials. It is the only component of the discovery cycle that is outside the planner. Although technically a part of the general teaching dilemma, materials comprise a separate component of the model because it was the element of the general teaching dilemma most frequently and routinely involved in planning.

This component includes not only the teaching materials provided by the school or district, but also any potential source of teaching ideas available to the planner. Mrs. Lisa, for example, frequently used articles or pictures from magazines, papers, and catalogues that gave her ideas for activites or for new teaching materials. She also routinely gathered ideas and materials from discussions with other teachers, in-service training, and so forth.

The sole function of materials in the discovery cycle is as a resource for problem conceptualization. In the same way knowledge and experience served as an internal storehouse or repertoire of ideas, materials serve as the external source. Ideas generated by materials sometimes immediately became part of Mrs. Lisa's knowledge and experience though others remained external. They were sometimes written on cards and inserted in her plan book for later reference, or, if they might be more appropriate for next year, they were "stored" underneath the plan book she kept open on her desk.

Mrs. Lisa seemed to be on a constant lookout for potential ideas. She brought in materials from home and got ideas from discussions with other teachers. Problem finding was carried on constantly outside of formal planning and took the form of a general attitude or "set." This is similar to Selz's "productive utilization of previously abstracted means-ends relationships" discussed in the previous chapter. He referred to a self-imposed, permanent motivation or "set" to build up one's repertoire of solving methods. This set was described as permeating all aspects of the person's activities so that

means are constantly collected and stored regardless of whether specific plans or problems are in mind. This attitude or motivation seemed to be pervasive in Mrs. Lisa's teaching, and it is proposed that this "problem finding set" is a further source of motivation for the discovery cycle in this model. (The other motivating factors proposed earlier were the striving for completion of the teaching goal conceptions and the creating of order where none exists.)

Initial Problem Conception

The product of problem finding is the initial problem conception. This refers to the abstract, schematic idea (conception) seen as a worthy prospect for further elaboration. As mentioned above, the only general constraints put on this idea are that it contributes to the completion (fulfillment) of the teaching goal conceptions and that it has not been tried and rejected in the present planning situation. In other words, it must be perceived as a worthy instructional idea that has not recently failed. These conditions are lax to increase the probability of creative ideas emerging from the discovery cycle and to provide enough ideas as sufficient "grist" for the design cycle. One restriction the discovery cycle does not impose on the initial problem conception is that it be realistic. "Utopian" ideas are usually pared down quickly in the early phases of the design cycle, although they might serve as some recurring aspect of the teaching goal conceptions, for example, an implicit "ideal classroom."

The specificity of initial problem conceptions is usually very low. The job of the discovery cycle is to generate problems. The job of the design cycle is to formulate, elaborate, and specify them. These

initial ideas may, however, vary in scope. For instance, problem finding within a planning dilemma like, "Think up some science unit for the winter," will result in initial problem conceptions needing much elaboration; whereas a dilemma such as, "Plan for an activity introducing the concept of a system," may result in ideas with more limited scope and needing less elaboration. At any rate, the function of the initial problem conception is to bring ideas to a sufficient stage of awareness so that a significant and promising problem can be further elaborated in the problem formulation/solution stage of planning.

Summary

The need for a problem finding stage in the model of teacher planning was defended by two arguments. First, the general teaching dilemma confronting teachers poses very few "presented problems." Thus, much of the planning carried out by teachers is not a product or a result of problem solving alone. Second, a distinguishing characteristic of teacher planning is the variety, uniqueness, and originality of results. These are not a direct response to problems posed by the general teaching dilemma, but are generated through some type of "creative" process.

Based on these factors, Getzels and Csikszentmihalyi's notion of "problem finding" was applied. Each of the components of the discovery cycle was suggested by teacher behavior or through logical extension of the requirements of the planning environment. The planning dilemma represents the general planning task posed by features of the general teaching dilemma such as complexity, immediacy, and unpredictability. The teaching goal conceptions are general teaching goals described

using a goal representation proposed by de Groot (1965). Knowledge and experience represent the teacher's repertoire of knowledge, skills, and methods built up over years of teaching; and materials represent the external source of ideas and problems for further planning.

The model proposes that problem finding results from the interaction of the four components in the discovery cycle. The generality of this study provided few clues about the actual methods involved in problem finding; however, it is proposed that problem finding involves processes of sensing, searching, generating, and manipulating (e.g., combining) ideas.

Three factors are proposed in the model as motivational influences in problem finding. The first two seem to arise from teaching goal conceptions. They are (1) a "disposition" towards completion of the teaching goal conceptions, and (2) a "need" for creating order out of the "chaos" presented by the planning dilemma. The third motivational factor suggested is a self-imposed "problem finding set" involving a constant striving for building up one's repertoire of problem finding methods and resources.

The product of problem finding in the model is an initial goal conception. This refers to the awareness of a potential planning problem that is most likely stated in a vague, general form similar to Selz's schematic anticipations. The process of taking this initial problem conception and elaborating, formulating, and solving it to produce an instructional activity takes place in the problem formulation/solution stage of planning. This stage will be discussed next.

Problem Formulation and Solution

Introduction

The second stage in the model of teacher planning involves problem formulation and solution. The basic assumption made in this stage is that problem formulation is an essential element in problem solving and that the two processes proceed hand-in-hand. The interweaving of these two processes is necessary because of the openness of the planning problem situation. Before a problem may be solved, it must first be discovered and then formulated into a manageable stage.

Based on the characteristics of the problem situation, problem formulation and solution activities are protrayed as a design process. The obvious parallels between the situations confronting teachers and those confronting designers were presented in the previous chapter. In both types of problems, no problem specificiation is given or agreed upon, no formal language with precise solution operations are available, and the goals to be achieved and the restrictions on the problem are open to interpretation.

There are many features of the design process that are characteristic of teacher planning. It is a process of conceiving, creating, and forming some plan, scheme, or artifact. It is a morphological and interative process. It involves a peculiar mix of creativity and reason. It involves analysis of one possibility at a time, and in such a way as to require that the planner be "advocate, witness, judge, and jury" (see Collins' characterization of architectural design, p. 242). The primary decision process involves the rejection of an unworkable idea rather than choice among alternatives.

Based on these apparent similarities, the problem formulation/solving stage of planning is modeled after design processes that have proven to be characteristic of musical composition (Bahle), chess thinking (de Groot), and architectural design (Baer, Eastman). In all three of these situations, problem solving has been characterized as a process involving alternation between phases of problem development (elaboration, construction) and phases of problem reformulation (adaptation transformation). In other words, findings suggest a general design process made up of continual goal development involving a cycling between solution anticipations and the results of attempts at solving subproblems. The existence of these processes in three such apparently disparate endeavors as playing chess, writing a song, and designing a building adds credibility to the notion of a "principle of creative form-making" (Bahle, 1939).

Four characteristics of Mrs. Lisa's planning were observed in this study that suggested design processes like those described above. The first was the planning situation confronting Mrs. Lisa. It was such that there were few preplanned or prepared instructional materials or activities from which she could choose. This required that she search for activities that would conform to district guidelines and her own goals. When found, they almost always had to be developed and adapted to fit the characteristics of her classroom, most notably, the split nature of her class. For topics such as writing skills, few materials or activities were available in any form, so planning took on the form of instructional development and design. Even when preplanned materials were available, a decision to use a unit format (e.g., in science and social studies) required extensive new planning.

The second feature of Mrs. Lisa's planning that suggested a design process was the absence of alternatives in her planning. In early stages of planning (i.e., the problem finding stage), alternatives were sometimes generated as possible directions for unit planning, but there was a conspicuous absence of fully elaborated and developed activity or lesson alternatives as products of her planning. Rather, Mrs. Lisa's planning seemed to progress along a route that produced only one final plan or activity. Failure of this one activity or lesson in the classroom almost always resulted in a change to a "filler" activity (e.g., choice time) rather than a switch to some preplanned alternative. Failure at higher levels usually resulted in replanning rather than an adoption of some alternative plan "waiting in the wings." In other words, Mrs. Lisa's planning seemed to be focused on the development of one idea, plan, or activity at a time, and time and energy were not diverted to the development of alternatives which might never be used.

This strategy makes sense in Mrs. Lisa's planning situation since almost every new plan, lesson, or activity had to be built from the ground up. Developing alternatives that may never be implemented would be an inefficient tactic since if not used now, there is no assurance that they can be used in the future. Time and energy are at a premium in teaching, and such planning may be very inefficient.

The third feature of Mrs. Lisa's planning suggesting a design process was the progressive elaboration of plans and activities over time. This was an obvious feature of her planning and was required by the complexity and unpredictability of the planning dilemma and by the extensive scope (in time) of the teaching and planning task. It is obviously not feasible to produce polished palns for teaching twenty

seven different learners over nine months. The task requires that planning progress from general to specific, or as Chapter VI suggested, from yearly to term, to unit, to weekly, and to daily planning.

Even the planning done on one level was characterized by elaboration. Unit planning, for instance, involved many steps to go from a lesson idea to its final form. Given that few of Mrs. Lisa's activities or lessons came prepared in final form (e.g., from a catalogue or program), the necessity for elaboartion to achieve a workable product was readily apparent.

The fourth feature that led to a conception of Mrs. Lisa's planning as a design activity was the lack of specific, well defined goals. Formally stated goals or objectives were altogether lacking in Mrs. Lisa's teaching. When asked about her teaching goals, Mrs. Lisa could only state them in general terms (see Chapter IV for a discussion of these goals). Since goals were not stated (or stateable) prior to problem solving (planning), it was assumed that they were formulated and elaborated as planning progressed. At lower levels of planning (especially weekly and daily), goals and problems were often fixed as a result of routinization. For this reason, the term and unit planning levels first suggested a notion of goal development.

The model of this "design" stage of teacher planning is primarily an outgrowth of the Selz-Bahle-de Groot theory of problem solving combined with those features of Mrs. Lisa's planning observed in the study. The field study provided suggestions for major components in the model; however, specifics of the processes are provided by the more controlled and detailed studies carried out by other researchers in analogous problem situations.

The Design Cycle

The primary mechanism of problem formulation and solution is reffered to as the design cycle. Here problem solving is portrayed as a design process involving progressive elaboration of plans or activities over time. This process is illustrated in Figure 8.3.

The dominant feature of the design cycle is its phase structure. The progressive development and solution of the planning problem takes place as it cycles through phases of elaboration, investigation and adaptation. These phases are a synthesis of the elaborative, move, and transition phases of de Groot and Baer's problem formulation processes of "construction" and "adaptation." As a problem progresses through the three phases of design, two major aspects of the thought process are involved. Elaboration and investigation draw on the planner's repertoire of problem solving methods (knowledge and experience), and adaptation is based upon the planner's total problem conception.

There are two other important general features of the design cycle. First, the process is serial in nature and only one problem is elaborated at a time. Elaboration, investigation, and adaptation continue until the problem is "solved" or until it is rejected as unworkable. The second feature is that the process happens over time. The length of the cycle can vary, however. At its longest, the cycle may continue across several levels of planning. For instance, a unit activity might be progressively solved over a period of several weeks. At the other extreme, the cycle may last only minutes if an initial problem conception requires only minor elaboration to become workable or if it is quickly rejected after several cycles because of the discovery of a major obstacle to its potential workability. Thus, the design process

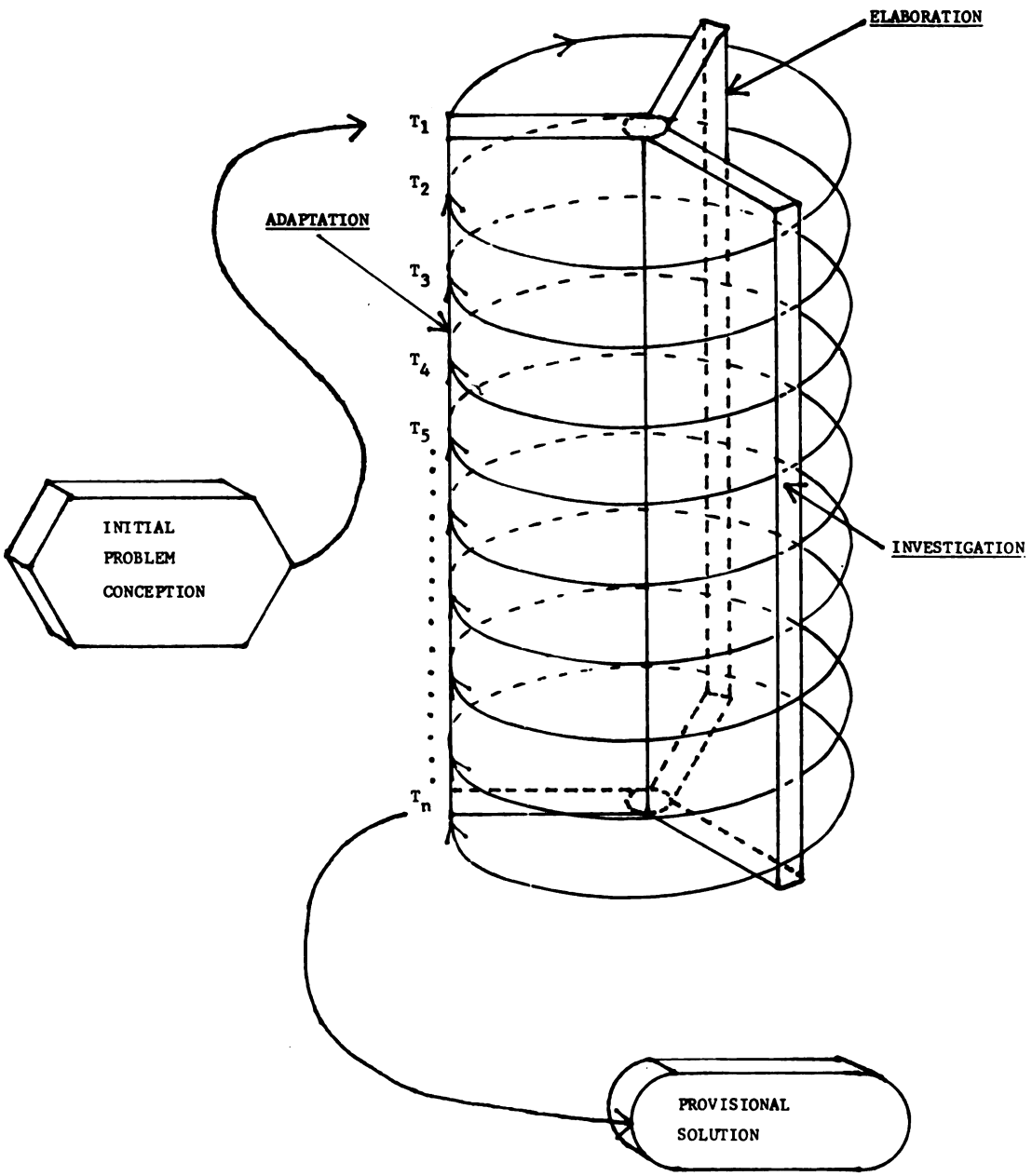


Figure 8.3 The problem formulation and solution (design) stage of teacher planning.

may occur in visible phases of elaboration punctuated by either the measurable "creative pauses" observed by Bahle or by the less obvious change of Einstellung and process noted by de Groot in his transitional phases.

Before describing each of the phases of the design cycle, a note should be made about the consciousness of the design proceses. In an earlier discussion of the distinction between knowledge and experience, the importance and prevalence of intuitive (non-verbalized) experience was acknowledged. It was also stated that de Groot attributed the larger part of chess mastership to intuitive experience. It is proposed here that even though teacher planning is a much more verbal activity than chess, the processes of planning are for the most part carried out at an intuitive level. This, however, is not to say that they are unconscious (which assumes no awareness), but rather than the proceses are usually difficult to report and describe verbally.

As with most skills, this lack of a ready analysis for the process is to be expected, since the focus of an activity for the skilled practitioner is not the process by which it is accomplished, but instead, the product or outcome. It is for this reason that the examination and description of skilled behavior (both physical and mental) is so difficult. The traditional method for treating this difficulty in information processing psychology has been to collect verbal protocols from practitioners by means of "thinking aloud," and then to build these behaviors into testable theories of information processing. Thus, consciousness or the ability to provide verbal reports of thought processes by the practitioner becomes unnecessary.

The elaboration phase. The elaboration phase is the construction phase of the design cycle. Its function is to elaborate and further complete the total problem conception by supplying detail to sub-problems or to the total problem conception.

Elaboration takes place through two methods. The first is the recombination of thought elements or routines that already exist in memory. In Selz's terminology, this method involves the "reproductive actualization of means." It is proposed that for the experienced teacher, this is the primary method of problem elaboration. The repertoire of means-ends relationships built up through experience is heavily relied upon for several reasons. Means-ends relationships accrued through experience likely carry with them some record of success or failure. Thus, the planner has more reason to predict its success as a solution. Also, elements stored in memory are usually readily available. This reduces the time and energy consumed by an elaboration since it eliminates the search and effort involved in locating new means. Of Selz's three methods of means actualization, "automatic means actualization" and "routine actualization of means" are the methods by which elaboration is most likely to take place since both are experience-based.

The second method of elaboration proposed by the model is the addition of new elements or "means" not a part of the repertoire of experience. This is referred to by Selz as "means abstraction." Here the problem requires that new means be found to produce new results. This method is subsidiary to the first method of elaboration primarily because of the additional "cost" involved. It should nearly always be

more efficient to actualize a means reproductively than to become involved in a search for a new one.

If, however, there is no appropriate element in memory and means abstraction becomes necessary, it is likely that all three of Selz's methods for means abstraction ("reproductive, " "immediate," and "coincidental") may come into play. The most intriguing of these possibilities for this model is "immediate means abstraction." In an earlier discussion of knowledge and experience, it was suggested that experience produces not only a repertoire of reproductively available means and methods in memory, but also a "schooled and highly specific way of perceiving." It is this perceptual ability that makes possible immediate means abstraction. In this method, a solution is immediately "read" from the structure of the problem situation. This immediate structural insight is a result of experience and provides a view of the situation not available to the neophyte. It is likely that for experienced planners, this "structuring" of the materials occurs frequently in new situations.

An additional source of new means lies outside of the planner. This is the materials available for instruction. As described in the problem finding stage, materials can serve as an external source of ideas. This may be especially true in the design cycle if the initial problem conception originated primarily from materials in the discovery cycle.

Elaboration is carried out on either the total problem conception or on specific subproblems. In teacher planning, the latter situation is more likely since the use of subproblems facilitates a more orderly and efficient approach to the complex problems involved in teaching.

For example, the primary objects of Mrs. Lisa's planning were activities. The most obvious subproblems of planning for activities are the seven features of activities described in Chapter V. When planning new activities, elaboration could be directed at detailing the location of the activity, its structure and sequence, the duration, the participants, acceptable student behaviors, instructional moves, and the content and materials. As the activity becomes routinized, fewer features would need elaboration.

At higher levels of planning, the products of Mrs. Lisa's planning were the plans themselves (outlines or lists of units, activities, and so forth). Two subproblems seemed to occur most frequently in this planning. The first was the generation of the components of the plan. These were usually unit or activity names. The second subproblem was the structuring and sequencing of the components. This occurred through ordering activities or units or by fitting them into a simple outline. At the yearly and term planning levels, these subproblems were divided further. For instance, yearly plans for most subjects were subdivided into terms.

Given that elaboration usually takes place on subproblems of the total goal conception, the question arises about the determination of the order in which they are taken up. When plans themselves are the object of the design cycle, explanation seems fairly simple. If components of the plan and its structure and sequence are the two subproblems of the task, the components will be taken up first since they are the necessary elements for structuring and sequencing. This problem, however, becomes more difficult when an activity is the object of planning. The sequence in which the various features are elaborated may be

determined by the planner's goals. Take, for instance, the two activity features of participants and instructional moves. On the one hand, participants might be considered first as a subproblem since the teacher feels that instructional strategy should be directed by the grouping of students. On the other hand, the teacher might specify moves first since it is felt that grouping should conform to the best way to teach the activity. It may be, however, that a precise knowledge of the ordering of these features is unnecessary. Since the design cycle is an iterative process directed toward completion of the total goal conception, it is reasonable to assume that a subproblem might be taken up again as a result of the elaboration (or changing) of the total goal conception at a later stage in the cycle. For instance, participants might be taken up first, but may need to be reexamined when the later elaboration of the other features suggests an activity that might work better with a different grouping. (This reanalysis of subproblems will be discussed further in the description of the adaptation phase of the cycle.)

Evidence for the sequencing of Mrs. Lisa's elaboration was difficult to collect because of the high degree of routinization in her activities. Unit planning came the closest to the creation of new activities, and even there, features such as duration, participants, and acceptable student behavior were usually already established. To determine a sequencing of all the activity features, it would have been necessary to be in the classroom in early fall when the activities and routines were first being established. Given the routinization of Mrs. Lisa's planning, it seems logical to hypothesize a routine sequence for the elaboration for plans and activities. If this is so,

directing this sequence may be a function of the executive planning routines.

To summarize, the elaboration phase functions as the "construction site" of the design cycle. Here, subproblems or the total problem conception is elaborated by means of the application of elements or routines stored in memory (means actualization) or by applying new features or elements (means abstraction) based on methods such as immediate means abstraction or ideas emerging from new materials. This elaboration is usually carried out on subproblems of the total problem conception and in a regular or routine sequence. The product of the elaboration phase is a subproblem solution or the completion of a facet of the total problem conception. These elaborations are, nevertheless, somewhat provisional since their feasibility or workability has not yet been examined. This is the purpose of the next phase in the discovery cycle--investigation.

The investigation phase. Following elaboration, the problem moves to the investigation phase of the design cycle. Here the elaborations are submitted to some form of analysis to determine the success or failure of the solving attempts. Investigation has two primary functions. First, it provides information about the workability of the elaboration and its success or failure as a subproblem solution. Second, it provides new knowledge and information about the planning problem based on the results of investigation. This is especially true of failures. Here the analysis of the solution provides information about aspects of the problem not part of the total problem conception and not anticipated in the previous

elaboration. This information may serve as a basis for a problem transformation in the subsequent adaptation phase.

Investigation relies primarily on two thought components. Like the elaboration phase, this phase draws upon knowledge and methods built up through experience. Successful and efficient investigation methods are developed to facilitate this "feasibility testing" in the same way that solving methods are developed in the elaboration phase.

The total problem conception is the second component of thought used in the investigation phase. Whereas knowledge and experience provide the methods for investigation, the total problem conception provides the criteria. The success or failure of an elaboration (or subproblem solution) is determined by its success in meeting the expectations established by the (schematic) anticipations that accompanied the subproblem. Thus, the schedmatic anticipation (a la Selz) provides not only the motivation (a gap with its accompanying "tension") to carry out the elaboration, but also supplies the criteria against which to measure its success.

On the question of whether one must think of this investigation process as one of "comparing" the expectancy with the outcome, de Groot rejects the explanation as being too "intellectualistic." Rather, he proposes that success or failure of an elaboration is analyzed with an anticipated degree or level of satisfaction in mind. This notion is supported in problem solving studies by statements such as, "That's not satisfactory," or, "That doesn't appeal to me, either." De Groot suggests further that this abundance of terms such as "(un)pleasant," "nice," "(un)satisfactory," "appealing," etc., speak for an interpretation of the expectancy as a (temporary) level of aspiration, or in

Lewin's (1951) terminology: as a quantitatively measured "quasi-need" that must be filled.

De Groot also proposes a quantitative expectation in chess thinking based on an "objective" evaluation of the board position. It is doubtful that such a notion is tenable in teaching since, unlike chess, there is no precedent nor basis for agreement on the value of any one solution for a teaching or planning problem. It is proposed in this model that the success or failure of an elaboration is solely judged according to an "aspiration level" created by the schematic anticipation.

Independent of the aspiration level used for investigation, the duration and thoroughness of the investigation phase may vary immensely. On the one hand, the analysis may proceed in an almost totally automatic or routine manner. Such a process may be directed by a component of an executive planning routine and might include a method like running down a mental checklist. On the other hand, the analysis may be more conscious and deliberative. Here the process becomes much more of an "investigation"--exploring elements of the solution in more detail. "Trying out" is one such method that was characteristic of Mrs. Lisa's teaching.

"Trying out" is a general solving method suggested by de Groot (see Chapter VII). Here, trying out is regarded as an investigation method and loses some of the meaning ascribed to the method in de Groot's discussion of chess thinking. There are, however, several elements of his definition retained here. First, trying out refers to a method that occurs only in thought. Although the actual physical trying out is not forbidden in teaching as in chess, it may not occur

until much later in the planning process (Stage III). In Mrs. Lisa's planning, trying out as well as elaboration could take place on paper or in physical planning activities (e.g., manipulating materials). Second, trying out is distinguished from trial-and-error because it is goal oriented (in this case, anticipation oriented) with a specific direction in mind (i.e., testing a specific elaboration). De Groot suggests three functions of trying out as a solving method: hitting on a solution, increasing information on the problem, and further discovery of new means. Only the second of these functions is characteristic of trying out as an investigation method. Hitting on a solution is more likely to take place in the elaboration phase and discovering new means should take place in the adaptation phase.

Trying out as evidenced in Mrs. Lisa's teaching mainly involved checking out an elaboration by thinking through and anticipating its outcomes in the classroom. This involved a kind of projection of the plan or more likely the activity onto her present class and teaching situation. This process is suggested by her frequent use of statements such as, "That will never go," "That might work," or, "I can see right now that that will never work." The degree to which imagery or visualization was a part of this process is unknown; however, very vivid visualizations of plans have been informally reported. As a general investigative method trying out seems to increase greatly the efficiency of planning. Rather than having to test every elaboration in the classroom or wait until planning has been completed, trying out allows a fairly accurate testing of a solution by placing it in a "projection" of the future that is based on knowledge and experience.

This visualization process suggests another criterion for determining success or failure of an elaboration not mentioned previously. Besides the aspiration level created by the specific anticipatory conception of the subproblem, there is also the results of the "visualized outcome." The product of these visualizations may be just as valuable and influential in planning as actual physical outcomes. The success or failure of this visualized outcome is also most likely judged in relation to a subjective aspiration level.

This notion of investigation is very similar to Dewey's (1922) definition of deliberation. He says that deliberation is the dramatic rehearsal in imagination of various competing possible lines of action. An "experiment" is carried out by means of tentative rehearsals in thought. The major distinction between Dewey's deliberation and investigation as proposed here is that Dewey tries out various alternatives, combining them and piting them against one another, while the investigation phase of planning tests only one line of action at a time. The important similarity between these two components is their function. They both provide a means to investigate action without the possible consequences of direct contact with the environment.

To sum up, the investigation phase of the design cycle supplies the results of elaboration to the total problem conception. If the elaboration phase is the construction phase of design, then investigation is the phase of inspection and quality control. The model proposes that investigation relies on knowledge or experience to supply the methods of investigation and the total goal conception to supply the criteria. Analysis may range from automatic or routine checking to more deliberate investigation. "Trying out" is proposed as a

general investigation method and one that supplies information about the success or failure of an elaboration by running it through a projection (visualization) of the situation for which it is planned. The results of investigation provide two pieces of information for the total problem conception: (1) success or failure of the previous elaboration, and (2) new knowledge about the planning problem. Both these pieces of information influence the problem transformation taking place in the adaptation phase.

The adaptation phase. Adaptation is the phase of the design process that completes the problem solving cycle. It is in effect both the beginning and the end of each cycle. This is because the adaptation phase is focused on the development and completion of the total problem conception.

The total problem conception, like teaching goal conceptions discussed earlier, is modeled after de Groot's "total goal conception." The total problem conception refers to the problem solver's anticipatory conception of the solution to the problem, or the "goal-as-attained." It begins as a vague and general anticipation, and as a result of elaboration, it is gradually specialized, differentiated, transformed, and completed.

The total problem conception arises from the initial problem conception which is the product of the problem finding process. At the beginning of the design process, they are essentially the same. Soon after being taken on as a problem, however, the initial problem conception acquires a more complete character. In addition to being an abstract idea (conception) with potential for elaboration, it becomes a

full-fledged problem with all the accompanying features. These include not only the conception of the main planning problem, but also anticipations about its difficulty or solvability, solution methods, notions of intuitive or emotional preference, and any motivational dispositions.

Once the total problem conception is initially formulated, it becomes the source of specific work problems or subproblems to be elaborated (solved). The results of this elaboration (either positive or negative) are fed back to the total problem conception by the investigation phase. These results thus effect the total problem conception by either completing a portion of it or requiring a new view of the problem because of unanticipated outcomes. At any rate, the total problem conception is always changed as a result of an elaboration. It never looks the same after an elaboration (and investigation) as it did before. Hence, in Figure 8.3 the total problem conception is changed and is different each time the cycle is completed (T_1, T_2, T_3, etc.).

The adaptation phase functions similarly to the transitional phases in de Groot's theory of chess thinking. Transitional phases punctuate elaborative move phases by integrating what has preceded and by preparing for the next actively organized investigations. They are characterized by "open-minded" thought processes such as reflecting, integrating, and abstracting. In short, "The subject's set or Einstellung is more receptive, less actively organized; his thought activity is not so much deductive and systematic but rather inductive" (de Groot, 1965, p. 112). Transitional phases are characterized by pauses in the thought process similar to Bahle's "creative pauses." Here the problem solver returns from special subproblems to problems

of higher order and in some cases to the main problem. It is in the transitional phases that problem formulation and transformation takes place.

The adaptation phase in this model functions in much the same way as de Groot's transitional phase. Whereas the other two design phases are phases of elaboration, adaptation is a phase of integration and transformation. The main purpose of adaptation is to formulate and develop the total problem conception which, in turn, directs elaboration (problem solution). Thus, adaptation involves two processes: the integration of what has preceeded and the preparation for what follows.

The integration of what has preceeded (elaboration and investigation) nearly always involves a return to a more general problem. This occurs because in most planning problems elaborations are carried out on only a part of the main problem (e.g., a subproblem). To provide information to the main problem the results of the subproblem must be analyzed in the larger context. This integration of the part with the whole allows the assessment of whether the previous elaboration has contributed to the completion of the main problem. Integration may also promote differentiation and specialization as subproblem elaborations detail and make concrete various aspects of the problem. This return to a more general problem allows abstraction. Here new possibilities may stand out against the concrete form of the problem thus far; the results of elaboration may suggest new properties or relationships in the problem.

The second process of adaptation involves preparation for further elaboration. As mentioned above, the adaptation phase always involves a problem transformation. This may be an enrichment and completion of

the main problem or involve a more radical structural transformation. Whatever the form, this transformation is the basis for further elaboration which requires a freshly set, specialized subgoal. The question then arises as to the direction of this specialization or, in other words, "What subproblem will be taken up next?" It is suggested here that further elaboration may be directed along one of two routes. First, the new subproblem may involve a reinvestigation of the previous subproblem (in the case of negative results) or it may involve a "deepening" of the design process by further detailing the previous subproblem. In this manner, elaboration proceeds by progressively detailing one portion of the main problem. An example of this in unit planning would be the continual elaboration of the first activity selected down to a level of detail at which it could be implemented immediately. The alternative to this procedure would be to return to the more general problem of generating activities once the first activity was generated and put off further elaboration until all the activities for the unit were selected. This second route for elaboration involves a "broadening" of the design process. This elaboration strategy employs a more "balanced" problem elaboaration since all of the subproblems are taken care of at one level before moving on to the next, more specialized level of subproblems.

Of the two elaboration strategies, Mrs. Lisa's planning seemed to conform more to the second alternative. This was particularly apparent across her levels of planning, but was also indicative of planning within each level. The "broadening" strategy seems to be the more efficient of the two since it minimizes the wasted time and energy spent elaborating a portion of the main problem if the problem is transformed

to eliminate that portion. The deepening strategy may, however, be useful in moderation. Here a subproblem might be elaborated several steps before a return to a higher problem. It is likely that the choice of strategy in a particular situation is carried out as a result of experience. This process may be routinized so that subproblem elaboration is guided by a component of an executive planning routine.

The nature of the total problem conception is such that it is rarely rejected in its entirety. Rather, it is transformed and modified until a workable solution is achieved. This lack of "scrapped" planning problems is primarily due to experience. In the discussion of the problem finding process, teaching goal conceptions and knowledge and experience were portrayed as "filters" to the problem discovery process. Thus, ideas reaching the form of initial problem conceptions have fairly good experience-based potential. Once the idea is formulated as a planning probelm, it is unlikely that so many unforseen results will take place to render the problem totally unworkable. A problem may be radically transformed, but continuity will exist in many aspects of the total problem conception.

A problem is "solved" when it achieves the level of anticipation or aspiration that makes up the total problem conception. Since problem formulation takes place hand-in-hand with problem solution, the final problem formulation is not achieved until the final solution. Once these two processes finally converge, the design process is completed. The fact that in most teaching situations the designer is also the implementer may mean that the end-product of the design cycle is

only a provisionally acceptable solution which will only become final as a result of success in the classroom.

To summarize, the adaptation phase of the design cycle is the seat of problem formulation and development. Here partial results are integrated and fitted into the total problem conception which is thereby updated. This implies a return to a more general problem that, by means of reflection, abstraction, and specialization, serves as a guide to the subsequent elaboartion. This elaboration is, in turn, integrated into the total problem conception and the continual process of interaction between the whole (the total problem conception) and its parts (subproblem elaboration) leads eventually to a provisionally accepted solution.

Summary

The second stage in this model of teacher planning is problem formulation and solution. The mechanism proposed for carrying out this process is the design cycle. In this cycle, problem solving is characterized as a design process involving progressive elaboration of plans or activities over time. The design cycle contains three phases. The first, the elaboration phase, is the construction phase of the design cycle. Elaboration involves the detailing and solution of subproblems by means of the application of elements or routines stored in memory ("means actualization") or by applying new features or elements ("means abstraction"). These subproblem solutions are then fed into the second phase of the design cycle, investigation.

Investigation involves the analysis of the elaborations to determine their workability (success or failure) as subproblem solutions.

It takes place by means of automatic and routine checking processes or through mental "trying out" involving the visualization or projection of the solution into the teacher's current teaching situation. Based on the results of this investigation, the third phase of the design cycle, adaptation, takes place.

The adaptation phase is in effect at the beginning and end of the cycle. In this phase the development, transformation, and completion of the total problem conception occurs. Results of previous elaborations are integrated into the total problem conception. On the basis of this transformed problem, new subproblems are generated for further elaboration. This cycle of elaboration, investigation, and adaptation continues until the problem conception is completed and the state of the solution meets the aspiration level set as part of the original total problem conception. The product of this cycle is a planning problem solution (a plan, activity, schedule, etc.) that may be carried out.

Implementation, Evaluation, and Routinization

Introduction

The focus of this model has been preactive planning for instruction. The discussion thus far has been concerned with two central aspects of this process--problem finding and the design cycle. The final stage of the model is not preactive planning, as such, but it does provide the final link in the instructional planning process. There are two other reasons for a discussion of this stage. It reflects the provisional nature of the results of the design process by proposing an actual "trying out" of the solution followed by an evaluation.

Also, the results of this process feed back to and build up the repertoire of knowledge and experience which, in turn, becomes an important component in subsequent planning. The interaction among implementation, evaluation, and routinization which makes up the final stage of teacher planning is illustrated in Figure 8.4.

The third stage of planning portrayed here holds mainly for planning for activities. It is hypothesized that the other major product of planning, plans themselves, do not generally follow this sequence. The primary reason for this was discussed in Chapter VI. Evaluation of plans by Mrs. Lisa was rarely carried out on the basis of how they worked out. Rather, their success or failure was determined on a structural basis beforehand; that is, on the basis of characteristics such as comprehensiveness, balance, variety, and so forth. Since plans are merely a framework to guide future action (instruction) and Mrs. Lisa's instruction was focused on activities, there was little concern for the quality of the plans, per se. The reason for this was that quality was usually fairly well assured through experience so that by the time of this study, plans that conformed to certain structural criteria nearly always served their purpose. In other words, planning had become so routinized that its effectiveness was rarely consciously scrutinized. The exception to this was the weekly schedule established during term planning. This was, in fact, the only plan actually implemented in the classroom.

For the above reasons, the third stage of planning in the model will be discussed within the framework of planning for activities. The following description of implementation, evaluation, and

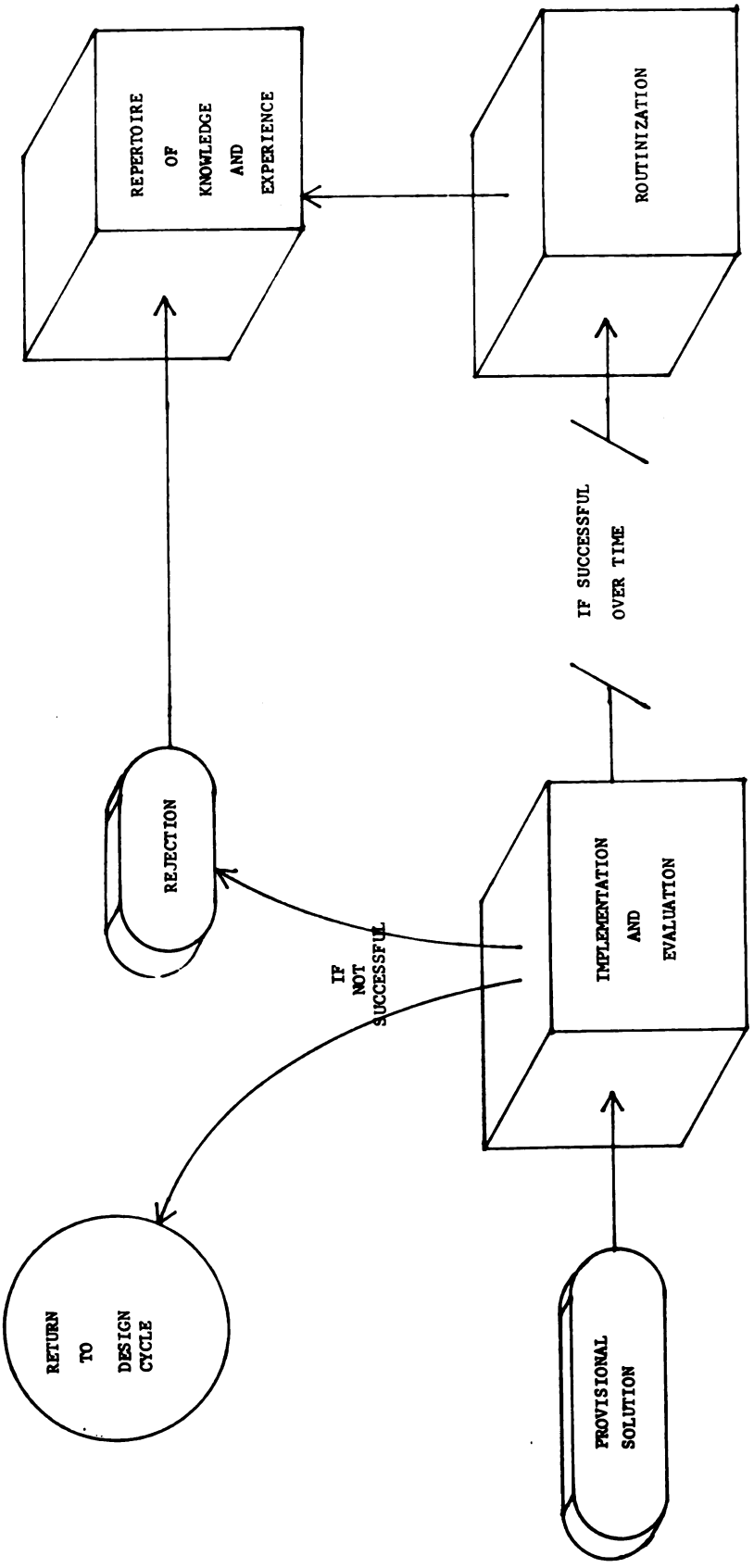


Figure 8.4 The implementation, evaluation, and routinization stage of teacher planning.

routinization will be brief and schematic and rely heavily on examples from this study.

Implementation and Evaluation

The final goal of instructional planning is the actual implementation of an activity in the classroom. All planning is aimed at making this moment as successful as possible for the students and the teacher. Even though activities have been submitted to many cycles of elaboration and mental "trying out," their success is not guaranteed until they have been tried out in the classroom with the present group of students. For this reason, the solutions produced by the design cycle are only provisional. Regardless of experience, implementation often yields unexpected and surprising outcomes.

The types of outcomes that Mrs. Lisa attended to most in the classroom were listed in the discussion of daily planning in Chapter VI. When asked how the day or how an activity had gone, Mrs. Lisa's response typically focused on student involvement, interest, and enthusiasm rather than on learning outcomes. Similar findings have been reported by Jackson (1968) and Clark and Peterson (1976). At first glance, this finding seems alarming; however, Jackson offers the following explanation:

> The problem turns, it would seem, on the distinction between the teacher's primary concern and his ultimate concern, on the thoughts and practices dominating his immediate actions with students, as contrasted with his hopes and expectations concerning the long-term achievement of individuals within his class. Teachers, particularly in the lower grades, seem to be more activity-oriented than learning-oriented. That is, they commonly decide on a set of activities which they believe will have a desirable outcome and then focus their energies on achieving and maintaining student involvement in those activities. Learning is important, to be sure; but when the teacher

> is actually interacting with his students, it is at the periphery of his attention, rather than at the focus of his vision...
>
> In some ways, the teacher's concern with the learning of his students is similar to a mother's concern with the nutrition of her children. Most mothers surely desire their children to develop healthy and strong bodies and they understand the general relationship between the quality of the food they provide and the status of their children's health. But in planning their meals, the nutritional value of the foods they use is thought of, if at all, in the very broadest terms. Many other variables, such as cost, convenience, esthetic quality, and ideosyncratic taste play a part in the selection and preparation of the family diet. Because of the adaptiveness of humans, in most cases the result is a healthy family.
>
> Like mothers, teachers have responsibility for definite aspects of their students' growth. They, too, understand the overall relationship between their daily activities and the acheivement of educational ends. But in their moment-by-moment decisions, the details of this relationship, the process of learning per se, is not uppermost in their minds. Rather, they seem to be guided by certain rule-of-thumb considerations that are constantly being modified by the specifics of each classroom situation. The result, if we can believe achievement test scores and other indicators of academic attainment, is "normal" educational growth for most students (1968, pp. 162-163).

During or subsequent to implementation, activities are evaluated in some manner. In Mrs. Lisa's classroom, activities were not accepted, rejected, or modified based on one day's results. They were typically given several days and sometimes several weeks before a final judgment about their effectiveness was made. Mrs. Lisa explained this by saying that children of this age need several days to adjust and adapt to changes or new situations. Early problems with activities (especially when the focus is on involvement, interest, and enthusiasm) usually ironed themselves out as the students became familiar with the activities. Mrs. Lisa took this same attitude with new weekly schedules and modifications were made only at the end of a two or three week adjustment period at the beginning of the term.

Changes in unworkable activities are usually along these lines: if an activity needed slight revision but is otherwise successful, modifications are made. This may only amount to a brief review via the design process focusing on the deficient element or feature. In the model this is reflected by a looping back to the design cycle where the problem is formulated, elaborated, and mentally investigated until a feasible solution is reached. This revision is then fed back to the next activity session.

The other alternative for unsuccessful activities is rejection. Here the whole activity is thrown out as unworkable. This is usually after the deficiencies have been unsuccessfully redesigned or when the difficulties affect features that are not modifiable. In Mrs. Lisa's classroom, this was a rare occurrence. This was probably due to the amount of experience on which planning was based and the efficiency and effectiveness of the design cycle in weeding out problems.

Only two activities were rejected by Mrs. Lisa after implementation during this school year. The first took place in fall term and was not directly observed in this study. By means of a recall of fall term based on Mrs. Lisa's plan book, information was, however, collected about this activity. The activity was a social studies unit on the states which, according to Mrs. Lisa, had been very successful the year before. The unit involved a series of lessons on each state covering such things as size, population, geography, and economics in a very general manner. Dittos were distributed on each state providing space where short answers on these topics could be written. The unit was begun in the second week of school. By the end of the third week, Mrs. Lisa realized that it was too difficult (mainly too abstract) for

most of her students. She tried it one more time in the fourth week, but in her estimation it failed again. Based on these results, she threw out the unit altogether and moved on to another unit.

The other rejected activity took place in winter term. This was an "optional" activity called the "word contest." This involved the voluntary deciphering of a scrambled word written on the small blackboard every Monday. If a student could decode the word by Thursday afternoon and turn in an answer by Thursday, a small prize was awarded. After the second week, several students were complaining that other students were telling each other the answer or were receiving help at home. After observing this herself and finding entries in handwriting other than the students', she decided to discontinue the activity. The difficulties were so integral to the activity that no modifications could have been made. Also, since the activity was not an integral part of her instruction, there were few qualms about rejecting it. This and the failure of the states unit were both "chalked up to experience" as the arrow indicates in the model.

Routinization

Many activites that are successful in the classroom are further changed by the process of routinization. More accurately, they go through a process of being "unchanged"; that is, their elements and features are established to the point of becoming routine. As mentioned in Chapter V, routinization functioned to lessen the planning burden on Mrs. Lisa by reducing the number of activities or activity features that needed to be planned on a regular basis. Because of this, most of Mrs. Lisa's planning during winter and spring terms was

devoted to social studies, science, and math unit planning--activities for which she had chosen to spend more time, and on activities such as field trips and cooking for which routinization was not feasible. A lengthy, if incomplete, discussion of Mrs. Lisa's routinization of activities was offered in Chapter V and the reader is referred there for more information on the routinization process.

In the planning model, routines established in the classroom become part of the teacher's repertoire of knowledge and experience. This illustrates an important link between current teaching and future planning. As activities take on a routine character in the classroom, these established patterns of teaching may also take on a routine character in memory. Chase and Simon (1973) in an article entitled "The Mind's Eye in Chess" suggest that the bulk of the chessmaster's experience is represented by tens of thousands of visual patterns of chess moves stored in memory. As a "new" configuration is encountered on the board, it calls up the same pattern from memory along with the accompanying solution methods and strategies. It may be that experience in teaching is in a similar manner constructed of a repertoire of routines in memory called up (immediately abstracted) by specific planning and teaching situations. These routines (or "programs") may then be implemented wholly or in part as solutions (elaborations) for particular planning problems. Thus, routinization of activities or strategies serves not only a current purpose of reducing the planning load, but also provides constructs in memory to simplify and improve future planning.

Chapter Summary

This chapter has been devoted to a theoretical model of teacher planning. The purpose of this model is to propose a general representation of the components of the planning process that may function as a basis for further theory and research on teacher planning. The model is grounded on observations of Mrs. Lisa's planning during the study, on findings from other studies of teacher planning, and on theory translated from models of planning processes in musical composition, chess, art, and architecture.

The model's focus is on individual, preactive, deliberative planning for instructional activities. It deviates from traditional models of planning in that the emphasis is on the discovery and design processes in planning rather than on choice processes. The model portrays planning as "purposeful problem solving" as opposed to "rational decision making."

Three stages of teacher planning are represented in the model. The first stage is called problem finding. The need for this stage arises from the nature of the planning problem situations; rather than having problems presented to them, most planners must interact with the planning dilemma and discover those problems needing specific planning. The model protrays this process in terms of a discovery cycle. Here problem finding takes place as the teacher's goal conceptions, knowledge and notion of the planning dilemma, and the materials available for planning interact. The product of this process is an initial problem conception worthy of further exploration.

The second stage in the planning process is called problem formulation and solution. The mechanism proposed for carrying out this

process is called the design cycle. In this cycle, problem solving is characterized as a design process involving progressive elaboration of plans or activities over time. The design cycle contains three phases. The first, the elaboration phase, is the construction phase of the design cycle. Elaboration involves the detailing and solution of subproblems by means of the application of elements or routines stored in memory ("means actualization") or by applying new features or elements ("means abstraction"). These subproblem solutions are then fed into the second phase of the design cycle, investigation. Investigation involves the analysis of the elaborations to determine their workability (success or failure) as subproblem solutions. It takes place by means of automatic and routine checking processes or through mental "trying out" involving the visualization or projection of the solution into the teacher's current teaching situation. Based on the results of this investigation, the third phase of the design cycle, adaptation, takes place. The adaptation phase is, in effect, the beginning and end of the cycle. In this phase, the development, transformation, and completion of the total problem conception occurs. Results of previous elaborations are integrated into the total problem conception. On the basis of this transformed problem, new subproblems are generated for further elaboration. This cycle of elaboration, investigation, and adaptation continues until the problem conception is completed and the state of the solution meets the aspiration level set as part of the original total problem conception. The product of this cycle is a planning problem solution (a plan, activity, schedule, etc.) that may be carried out.

The third stage of the planning model involves implementation, evaluation, and routinization. In this stage the problem solution is implemented and evaluated in the classroom. If after a period of time it is not workable, it is submitted to further planning (by the means of a return to the design cycle) or on rare occasions is rejected. Most successful activities become established in the classroom by means of routinization. Whatever the outcome of the plan or activity, it becomes part of the teacher's repertoire of knowledge and experience that will play a major role in future planning.

CHAPTER IX

DISCUSSION AND IMPLICATIONS

The three previous chapters have described three different aspects of planning. Chapter V discussed the "technology" of Mrs. Lisa's planning focusing on the role and function of instructional activities and routines. Chapter VI provided a view of the general structure in which Mrs. Lisa's planning takes place. In Chapter VIII, a general model of preactive planning was presented portraying planning as a problem solving process chiefly involving problem finding and design.

The purpose of this chapter is to discuss the findings and results of this study and to present some implications for future research and training. The study will first be discussed in light of the findings of the previous research on planning both in and out of education. Next, the methods used in the study will be reviewed focusing on the usefulness of combining ethnographic and information processing techniques to address research problems of this sort. After that, implications for future planning will be discussed along with a model for guiding future research problems of this sort. Last, the implications of this study for teacher training in planning will be mentioned.

Comparison of Results with Other Planning Studies

Of the five empirical studies of teacher planning mentioned in Chapter II, three will be compared with the results of this study. These are Zahorik (1975), Peterson, Marx, and Clark (1977), and Morine (1976). (Zahorik, 1970, was concerned mainly with the effects of

planning on interactive teaching behavior, and results from Morine and Joyce, 1976, are not yet in.)

To review, Zahorik (1975) found in a questionnaire study of 194 teachers that the kind of planning decision most frequently reported concerned pupil activities and that decisions about content were most frequently reported first. He concluded form this that decisions about behavioral objectives are not a particularly important planning decision in terms of quantity of use, and based on this finding, that teacher planning does not seem to follow the direction of the rational planning model in which planning flows logically from the specification of objectives.

Similar findings were reported by Peterson, Marx, and Clark (1977) in a study done at Stanford. They observed teachers spending the largest proportion of their planning time deliberating about content (subject matter) followed by decisions concerning instructional processes (strategies and activities). Like Zahorik, they found decisons regarding objectives conspicuously absent. While Zahorik found half of his teachers reporting decisions about objectives, Peterson, Marx, and Clark observed that only the smallest proportion of their teachers' time was spent on objectives (.04%) even though a suggested list of objectives had been provided to them beforehand.

Findings of the present study seem consistent with the results of these two studies. The most prominent and frequent concern of Mrs. Lisa's planning was activities (see Chapter V). The distinctions made among activities, content (subject matter), and materials made by Zahorik and by Peterson, Marx, and Clark were not apparent in Mrs. Lisa's planning. Content and materials were subsumed under activities as

features that helped define the activity. Thus, activities did not exist apart from some subject matter. Part of this difference, may, however, be definitional. Both Zahorik and Peterson, Marx, and Clark defined activities in terms of instructional process or strategy. This definition is much closer to the teacher instructional move feature of Mrs. Lisa's activities. In other words, the notion of an activity used in the present is much broader than those used previously and includes features that have previously been treated as independent decisions. It may be that the notion of instructional activity developed in Chapter V can provide a more useful framework for relating these various planning judgments and subproblems.

The discussion of routinization in Chapter V may provide an explanation for the additional findings in these two studies of the predominance of content as a focus of planning. Table 5.6 on page 147 showed that, even in such a highly routinized classroom as Mrs. Lisa's, content and materials was the feature of activities most frequently left "open" and requiring planning at the weekly level. For seven of her routinized activities, content and materials was the only feature not set. Based on Table 5.6, content and materials could be viewed as the most frequent subproblem that Mrs. Lisa had to deal with on a regular basis. This decision should become even more frequent for teachers with less routinized teaching. Except for the most highly routinized activities, decisions about content and materials should always be present. The presence of other foci should vary with the level of routinization.

Like Zahorik's and the Stanford study, behavioral objectives were not a central part of Mrs. Lisa's planning. Objectives were confronted

primarily in the form of district objectives for each subject matter area and were only used as a guide or framework for deciding on activities. There was no evidence in Mrs. Lisa's planning to support the rational model of planning. Based on these findings, planning was portrayed in Chapter VIII as a purposeful activity guided by teaching goal conceptions and the specific problem conceptions, and no provision was made for planning using behavioral objectives or specifically stated instructional goals.

The third study to be mentioned for comparison purposes is Morine (1976). She collected written plans from thirty-eight teachers for two experimenter-prescribed lessons (one in mathematics and one in reading) which were taught to a group of twelve of their own students while the rest of the class was absent (under the supervision of a substitute teacher in another room). The written plans were evaluated according to their specificity, format, the statement of goals, source of goal statements, attention to pupil background and preparation, identification of evaluation procedures, and the indication of possible alternative procedures.

In general, she found that most of the plans submitted by the teachers were moderately specific outlines listing possible examples or questions that the teacher might use in the lesson. An outline form was also popular in Mrs. Lisa's planning; however, at no level in her planning were specific examples or possible questions written down. This agrees with the follow-up notes or comments by approximately two-thirds of Morine's teachers stating that their written plans submitted for the two experimental lessons were much more detailed than usual and that most of their regular planning was done in their heads. The

degree of detail or specificity for normal plans was, however, never elicited from the teachers.

The lack of specificity about instructional strategy in Mrs. Lisa's "thinking aloud" while planning and the recurrent patterns in her teaching were major factors leading to the proposal of the existence of instructional routines in Chapter V. It appeared that general "strategies" were routine while specific examples and questions were partially routine and partially composed in response to the situation at hand. In this manner, Mrs. Lisa could have the security of a general format to follow, yet be flexible to the uniqueness of each teaching encounter.

Morine also found that when goals were stated by teachers, they were non-behavioral goals. The teachers not only selected from the goals provided to them, but also tended to restate and develop original goals. As mentioned above, this non-behavioral orientation of goals and the tendency to modify goals better to suit one's purpose was also characteristic of Mrs. Lisa's planning.

Attention to evaluation procedures and to pupil background characteristics was almost entirely absent from Morine's teachers' plans. She stated three hypotheses to account for this finding:

1. Since these were "one shot" lessons inserted into the curriculum, teachers devoted less thought than normal to these aspects;

2. These aspects may be more difficult to get out of the teachers' heads and onto paper; or

3. Teachers do not really devote much attention to these aspects of instruction in their daily lessons.

This lack of visible attention to evaluation procedures was also apparent in Mrs. Lisa's planning. However, none of the above listed

hypotheses seems to account best for its apparent absence. The lack of specified evaluation procedures in Mrs. Lisa's planning seemed to be due to the built-in nature of her evaluation procedures. Written work was routinely evaluated and marked throughout the day (see discussion in Chapter IV), and student progress in tasks not regularly producing written products (e.g., reading) was monitored through regularly scheduled contact with all the students. Because of this, special evaluation features were rarely included in activities and a look at her plans would reveal an apparent absence of a concern for evaluation.

Attention to pupil background characteristics was also not visible in Mrs. Lisa's plans themselves, but they were readily apparent in her planning process. Chapter VI indicated that pupil characteristics were an important source of information at all levels of Mrs. Lisa's planning. In terms of the process model proposed in Chapter VIII, pupil characteristics are an important part of knowledge and experience and play a role in both problem finding and the design process. Although pupil characteristics are used to guide the process of planning, they are not necessarily apparent in the product.

Pupil characteristics and other factors influencing planning might be more visible if plans included several well developed alternatives for action. Then the choice among alternatives might be based on the presence or absence of certain aspects of the environment. However, in both Morine's and the present study, alternatives were rarely, if ever, mentioned in the final plan. Although only a small proportion of Morine's teachers listed alternatives in their plans, most of the teachers later indicated during an interview that they had thought of alternatives during their planning. Since only a few mentioned

alternative activities, it is assumed that most of the alternatives were "variations on a theme."

This lack of well developed alternatives as a product of planning influenced the form of the model proposed in Chapter VIII. A major feature of the design process was that only one planning problem was pursued at a time and only one solution was produced by the process. Alternatives might be considered as subproblem elabortions, but they would either be eventually rejected or incorporated into the total problem conception. Morine's finding that materials and cognitive considerations ("content") were reported most frequently suggests that these two aspects are essential subproblems taken up during the design process. Had Morine's teachers been following a rational model of planning, one would have expected a much higher frequency of alternatives reported in the plans. Although the focus of Morine's study was not process description, it can be inferred from the planning products and the teachers' responses that few, if any, of the teachers were following the rational planning model.

To date, no studies of the teacher planning process itself have been conducted to which the results of this study may be compared. In the three studies just discussed, process can only be inferred from products of planning or time spent in various planning endeavors. Studies of planning outside of education have had little more to offer. Case studies of national or city planning have revealed little more than a lack of evidence to support the rational model. Based on this, theories such as Lindblom's (1959) "successive limited comparisons" or Etzioni's (1968) "mixed scanning" have been proposed but not empirically tested (see Chapter II). Individual planning itself has

only been systematically investigated in the area of architectural planning, and then only recently. The similarities between this process and teacher planning were discussed in Chapter VII.

It is obvious from this discussion that research on teacher planning in general is in its infancy. Research on the information processing involved in teacher planning has been initiated only within the last few years. There is a great need for further research in this area to test the results of this investigation and the models that have been proposed. Before addressing this question of the directions for future research, several comments will first be made about the methods used in this study.

Discussion of Method

In Chapter III, a description and rationale was presented for the methods used in this study. Two sources of naturalistic data--microethnography and process tracing--were discussed as well as more artificial tasks such as the Teacher Planning Shell simulation and several judgment tasks. Since one of the purposes of this study was to ascertain the usefulness of these approaches for studies of teacher decision making, the advantages and disadvantages of these methods as used in this study will now be discussed.

The Ethnographic Approach

The observations and field notes made while functioning as a participant observer in the classroom proved to be an indispensable component of the study. They provided an overall view of the characteristics of Mrs. Lisa's teaching situation that would not have been visible in occasional visits to the classroom. The observations presented the

necessary backdrop for analyzing and understanding the activities that made up Mrs. Lisa's preactive planning. The complexity and long-term nature of the planning activity made observation over long periods of time necessary to determine the regular patterns and organization of planning deliberations.

There are several important aspects of Mrs. Lisa's teaching and planning that emerged only after extended periods of time in the classroom. One was the dominance of activities in Mrs. Lisa's teaching and planning. Another was the regularity of activities and the tendency towards routinization. A third aspect was the various levels of planning that occurred in her planning. Random observations may have overlooked infrequent yet critical planning activities at the unit and term levels. Finally, the elaboration process was apparent in planning only after observing plans evolve over time as they moved from higher to lower planning levels. Complete design cycles were difficult enough to observe during the extended amount of time spent with Mrs. Lisa, and it is likely that they would have been nearly invisible with less frequent participation in the classroom.

Besides providing a comprehensive view of Mrs. Lisa's teaching and planning activities, the ethnographic portion of the study also made possible a detailed description of the environment and context of the planning task. The complexity, unpredictability, and immediacy of the teaching environment proposed by the ecological psychologists was confirmed in Mrs. Lisa's classroom, and the functional value of planning for coping with these factors was readily apparent. The field observations also provided a description of the students, the classroom, the curriculum, and the many other variables that shaped Mrs. Lisa's

planning environment. In short, the ethnographic description of Mrs. Lisa's teaching provided the long-term, detailed, and integrated look at the task environment for her planning which made possible a sensible description of the planning methods she used to function effectively in a classroom situation.

As a further note, it must be mentioned that the relationship developed with Mrs. Lisa by participating in her professional life for almost half a school year was an enormous asset to the study. Many insights into the structure, processes, and methods of her planning were gleaned from comments made in an atmosphere of frankness and trust that is not characteristic of most research on teaching. Her willingness to open up and report her thoughts during most of the school day provided revealing and important information about a complex social and psychological endeavor that would have been unavailable to an "outsider" in the situation.

The major problem with the ethnographic approach in this study was the difficulty in going beyond a behavioral level of description. This is not surprising since the method has been most successfully used to study social rather than psychological phenomena. The richness of the teaching environment at the behavioral level tended to "overwhelm" the process tracing analysis. Often, when a more detailed description would have been more appropriate, the behavioral description was still used since it was difficult to recognize when it was appropriate to "switch gears" and then actually do it. Even though the complexity of the situation required a great deal of behavioral description, it may have been useful to focus in on specific planning processes at an earlier time. Had strategic research sites been identified earlier in

the study, more empirical support for the general process model proposed in Chapter VIII may have been produced.

The Information Processing Approach

Whereas ethnography is a method most often used to look at processes of greater scope than those observed in this study, process tracing is a method that has traditionally been used to look at phenomena of smaller scope. Both methods, however, were "out of their element" for similar reasons--ethnography because of an increase in detail, and process tracing because of an increase in complexity.

The biggest obstacle to the process tracing analysis was the extreme complexity of the planning situation. Process tracing has traditionally been used on fairly simple problems or on tasks that could be completed in one session (with the exception of Clarkson, 1962). Mrs. Lisa's planning departed widely from these situations in two ways. First, the problems of planning were usually not "presented" but were rather discovered in the planning situation. This created an additional problem of identifying the problem being pursued and of knowing when problems were first attempted. Second, planning nearly always took place over more than one session and was not a process that could be "compressed" into one sitting, because it was not always apparent how planning sessions fit together until later in the study when larger patterns of the planning process were identified. Also, the long duration of many design processes made it difficult to trace a plan from start to finish. Because of these difficulties, the product of the thinking aloud was not a process tracing representation in its traditional form of decision trees or flow diagrams. Rather, each

thinking aloud segment provided additional pieces of information that eventually contributed to the final description of Mrs. Lisa's planning.

Although the process tracing analysis in this study did not result in the traditional representations, it did accomplish to a large extent its intended purpose. The thinking aloud process produced verbal data about Mrs. Lisa's planning processes while they were occurring in the natural situation. This investigation thus became the first study to attempt to "capture" and describe planning as it happened in the classroom over an extended period of time. The thinking aloud procedure allowed a look at normally covert mental processes that were for the most part free of rationalization, theorizing, and self-screening. The verbal reports were sufficient to provide insight into the general directions and processes used in Mrs. Lisa's planning. It may be that because of the complexity and duration of the planning process, more detailed representations cannot be easily produced without requiring the use of more obtrusive measures that intervene in the natural process.

The Teacher Planning Shell and the Judgment Tasks

In addition to the naturalistic data collection strategies, several mini-experiments were conducted. The purposes of these tasks were to provide more detailed and specific data about information to which Mrs. Lisa attended regarding pupils and activities, and to attempt a more controlled analysis of her planning processes.

The first of these purposes was the major goal of the three judgment tasks: the pupil sort, the activity sort, and the sociogram

analysis. The pupil sort and the sociogram analysis supplied additional information about characteristics of the students to which Mrs. Lisa attended and provided further insight into pupil behaviors and qualities that she regarded as important as well as cues that she may use during her planning. This information was incorporated into the descriptions of Mrs. Lisa's planning in Chapter VI. The activity sort supplied similar information about Mrs. Lisa's perception of activities. Categories generated in all three of the judgment tasks served as guides for later observations that tried to document the use of these cues in her planning.

The second purpose listed above--attempting a more controlled analysis of Mrs. Lisa's planning process--was the goal of the Teacher Planning Shell. Little new information was supplied by this simulation for two reasons. First, the description of Mrs. Lisa's actual planning obtained prior to the simulation was so complete that no new information about the process arose in the simulation. It did, however, serve further to confirm the field observations. Secondly, the most comprehensive planning task (planning pilot lessons for a new social studies program) proved to be unrealistic to attempt in a single setting. Mrs. Lisa commented that normally a weekend would be spent evaluating the materials and planning the lessons. Her attempt at a somewhat simplified task revealed no new insights into her planning process.

A positive outcome for the Teacher Planning Shell was the comments by Mrs. Lisa about the realism of most of the tasks and the ease of identifying with and getting into the tasks. This reported realism and psychological fidelity of the simulation suggests that further

development to remedy some of the encountered problems might be worthwhile and may produce an effective tool for the study of teacher planning.

Conclusions about Method

The primary method of this study combined two data collection strategies developed in different research traditions for different purposes. This combination produced representations that did not conform to the investigator's expectations or to traditional usage, but the combined results seemed to produce valid and worthwhile results. This attempt at describing human information processing in naturalistic settings does show that even complex decision processes can be studied and described in a field setting. The sacrifice in detail and specificity that may be necessary in studies of this type may be greatly outweighed by the value of obtaining a picture of human information processing *in situ*. Because of the necessary lack of control, this type of study may be best suited for the generation of theory and models that may be further tested by more detailed and controlled studies. It is possible that comprehensive field studies of this sort can provide a basis for theory development that has been sorely lacking in research on teaching to date.

Implications and Directions for Future Research

The primary goal of this study was to provide a detailed description of one elementary teacher's planning decisions as they occurred in the classroom over an extended period of time. A secondary goal of the study was to present models of the planning process that might function as a starting point for research and theorizing about the information

processing involved in teacher planning. It is the purpose of this section to state some of the questions raised by this study that might be appropriate topics of further research.

The findings of this study imply that planning is an important, deliberative process in teaching, that it is amenable to fairly detailed description, that it is a multi-faceted process occurring over several levels of specificity and scope, and that it proceeds in a purposeful manner differing from popular "rational" conceptions of planning prescribed by many theorists and educators. The results of this study may be grouped into three parts: (1) the "technology"of the teaching process related to planning (Chapter V), (2) a structural model of preactive planning (Chapter VI), and (3) a process model of preactive planning (Chapter VIII). The following questions for future research will be listed under each of these three topics.

The Technology of the Teaching Process

In Chapter V, Mrs. Lisa's technology of teaching was described in the context of two especially salient practices: planning and teaching by activities and the use of teaching routines. Future research might address the following questions about the use of activities in planning and teaching:

1. How widespread is the use of activities as basic structural units in planning and teaching? Are there other elements or units that are also used?

2. What is the variance in the types and numbers of activities used by elementary teachers?

3. What features of activities are most salient in teacher planning?

4. How common is the set up-lesson-take down activity structure identified in this study?

Questions that might be studied regarding teaching routines are:

1. How prevalent is the use of routines among classroom teachers?

2. Can the four types of routines identified in this study (activity routines, instructional routines, management routines, and executive planning routines) be located in the planning of other teachers? Are there other widely used routines that were not salient in Mrs. Lisa's teaching?

3. How common is the high degree of routinization that was found to be characteristic of Mrs. Lisa's teaching? Does the amount of routinization vary systematically across grade levels or across teacher personality types?

4. Can the presence of routinization be related to the efficiency and effectiveness of preactive planning or interactive teaching?

5. Can degree of routinization be related to specific outcomes such as classroom stability, time on task, achievement, or student satisfaction?

The Structural Model of Preactive Planning

The structural model of Mrs. Lisa's planning portrayed her planning as taking place at five different levels. At each level, four aspects of planning were described: (1) planning goals, (2) information sources, (3) form of the plan, and (4) the criteria used for judging planning effectiveness. Some of the major questions raised by this model are:

1. Can the planning levels identified in this study be generalized to other teachers? Are there other distinctions that are more common?

2. Are the goals, information sources, format, and "goodness" criteria identified in Mrs. Lisa's planning similar to those functioning in the planning of other teachers?

3. Are there significant differences in the planning skills involved in planning at different levels?

4. Can strategic research sites similar to those identified in Mrs. Lisa's planning be located in the planning of other teachers?

The Process Model of Teacher Planning

The process model of planning described in Chapter VIII characterized planning as a purposeful, goal directed process involving problem finding, formulation, and solution. Three stages of the model were discussed and research questions arising from the model will be listed under the appropriate stage.

Problem finding. Problem finding was characterized as a preliminary planning process made necessary by the "openness" of the teaching situation. Since planning problems needing solving were not always indicated by the environment, they had to be discovered by the teacher. This discovery process was portrayed as a cycle involving the interaction among the teacher's general goal conceptions, her knowledge and experience, her notion of the planning "dilemma" being confronted, and the materials available for planning.

Questions for further research arising from the model of this process are:

1. To what extent can the teaching dilemma be characterized as a "discovered problem situation"?

2. What factors in the environment contribute to the general teaching dilemma in other classrooms?

3. Can the "planning dilemma" be identified as a component of teacher perception functioning in open planning situations? How is it perceived? What are its components? Does it change across planning levels or over time? Does it really function to "frame" the problem finding process?

4. What are the components involved in a teacher's "teaching goal conceptions"? How specific are they? How do they change over time? Can they be "tapped" during the planning process as de Groot suggests? Do teaching goal conceptions function as an initial screen to generate ideas? Does the disposition towards their completion function as a motivational influence?

5. How do teacher knowledge and experience effect the problem-finding process? What gets stored in memory? --activities? --routines? Do teachers differ in the extent to which they rely on these factors? Does reliance increase with experience? Does experience provide "schooled and highly specific ways of perceiving" problem situations as de Groot suggests? What are the relative roles of intuitive and conscious experience? What are their functions in problem finding? Do they perform an evaluative function similar to that of the teaching goal conceptions? Do they provide direction by means of executive planning routines?

6. What is the relative contribution of the materials component to problem finding? What external sources of information and materials are drawn upon? Do materials serve additional functions than as an external resource for potential problem conceptions?

7. In what ways do the four components of the discovery cycle interact to produce initial problem conceptions? In what ways are problems sensed, searched for, generated, and manipulated?

8. What are the factors that motivate the problem finding process? Do such things as a disposition toward completing the teaching goal conceptions, a need for creating order where none exists, and a problem finding "set" seem to be apparent in other teachers?

Problem formulation and solution. Problem solving in the model was portrayed as a design process involving the progressive elaboration of plans or activities over time. Of the three phases of the design cycle, "elaboration" is the first. It involves the elaboration, detailing, and solution of subproblems by means of the application of elements or routines stored in memory or by applying "new" features or elements as a solution. These

subproblems are then fed into the second phase of the process, "investigation." Investigation involves the analysis of the elaborations to determine their workability as subproblem solutions. This by and large is accomplished through mental visualizations and rehearsal processes called "trying out." The results of these investigations are then fed into the third phase, "adaptation," where they are integrated into the total problem conception. Based on this transformation, new subproblems are generated for further elaboration. This cycle of elaboration, investigation, and adaptation continues until the total problem conception is finally completed. Questions for further research arising from this stage of the model include:

1. How valid is this notion of planning as a design process for the planning activities carried out by other teachers? Is ther evidence for a gradual development of goals (problems)? Does the process proceed through the progressive elaboration, investigation, and adaptation of one problem (activity, plan) at a time?

2. What are the methods and strategies used to elaborate planning problems? What are the relative contributions of experience and external sources? Do methods change with experience? In what order are subproblems taken up? Are the features of activities (i.e., duration, location, structure, etc.) common subproblems? What role do executive planning routines play in guiding and directing the elaboration methods?

3. What are the primary methods used for investigation of elaborations? How common is "trying out" as a general method? Do teachers vary in their ability to visualize or mentally rehearse elaborations? What criteria are used for judging the success or failure of elaborations? Are there other products besides knowledge of results and new information about the problem that result from the investigation phase?

4. What are the primary methods and mechanisms involved in the adaptation phase? Are there regular directions or patterns to problem transformations? Do teachers have a preference for direction in generating subproblems (e.g., deepening vs. broadening of the

investigation)? What criteria are used for judging the arrival at a problem "solution"?

Implementation, evaluation, and routinization. In this third stage of planning, the problem solution is implemented and evaluated in the classroom. If, after a period of time it is not workable, it is submitted to further planning or, on rare occasions, is rejected. Most successful activities become routinized over time and eventually become part of the teacher's repertoire of knowledge and experience influencing future planning. Some of the primary questions that need further study are:

1. How do teachers differ in their mechanisms for evaluating the success of activities in the classroom? How do their evaluation criteria differ? How long will an activity be tried before it is modified? How many modifications will be attempted before it is rejected? What criteria do teachers use for these judgments?

2. What are the mechanisms involved in the routinization process? How widespread is routinization among teachers? Do teachers vary in the rate at which activities become established? How is the balance between stability and flexibility maintained? What components of routines are stored in memory? Are whole routines stored in a similar manner to chess board configurations stored by chess players?

A Model for Planning Research

Listed in Part II of Chapter VII were four benefits of the use of theory in research stated by Zetterberg (1975). There were to:

1. Provide the most parsimonious summary of actual or anticipated research findings,

2. Coordinate research so that many separate findings support each other,

3. Locate the most strategic or manageable propositions for testing, and

4. Provide a limited area in which to locate false propositions, when a hypothesis fails to meet an empirical test.

It was suggested at that time that models may serve in the same descriptive, coordinating, and directive manner. Thus far in this study, several models and many different cognitive processes have been discussed as part of the teacher planning endeavor. The model portrayed in Figure 9.1 may be one way to illustrate and coordinate for further research the components of the planning process that have been described or proposed in this study.

The cube representing the research "space" was composed by combining three dimensions of the planning process represented in this study: the five levels of planning represented in the structural model, the three stages of the process model, and the cognitive components involved in planning represented by Simon's (1975 b) three phases of the design process--intelligence, design, and choice. Intelligence is expanded to include the perceptual and search processes of planning. Design includes the memory and the generation, combination, and manipulation processes. Choice includes processes for choosing among courses of action such as judgment and decision making.

It is feasible that future planning studies would choose a cell or a slice of the model to investigate. For instance, one might investigate choice involved in problem finding at the yearly level of planning or one might study problem finding in general across all five levels. One might also, for example, choose to study unit planning in general or select a certain planning stage or cognitive component to examine. As studies are completed, the model would provide a framework for coordinating the results and for indicating processes not yet

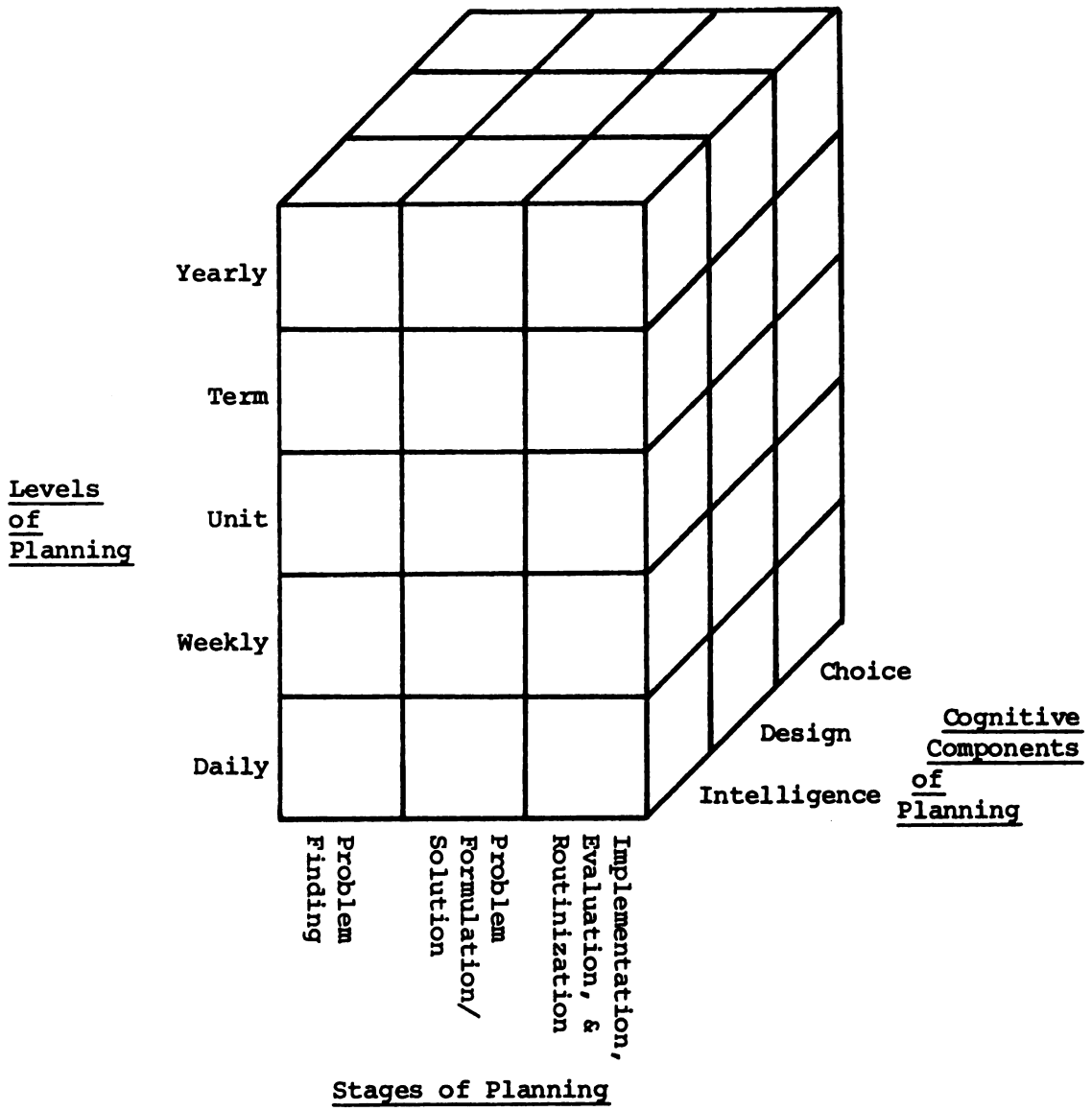


Figure 9.1 A model for planning research

investigated. It is also likely that future studies would modify the research space by adding or deleting aspects of each facet as the characteristics of the planning of many teachers are described.

Implications for Teacher Training

The Current Status of Training for Instructional Planning

Morine aptly summarized the current status of training for planning in most teacher education programs when she said that it begins and ends with the writing of behavioral objectives (Morine, 1973). This statement accurately reflects the influence of the engineering or systems approach (previously referred to as the "rational model") on all aspects of educational planning. Since a thorough discussion of this influence was presented in Chapters I and II, this model will be only briefly alluded to here.

The rational model of educational planning was first proposed by Tyler (1952) and was later developed by Taba (1962) and Popham (Popham and Baker, 1970). Four essential steps for planning are recommended by this model:

1. Specify objectives
2. Select learning activities (based on objectives)
3. Organize learning activities (based on objectives)
4. Specify evaluation procedures (based on objectives)

More recently procedures such as task analysis and re-teaching loops have been added to the model based on training models (e.g., Glaser, 1964) and the model has become known under such labels as a "technology of instruction" (Anderson and Faust, 1974) or as a "learning systems approach to instruction" (Davis, Alexander, and Yelon, 1974).

In opposition to this "separate end-means" approach is what has been referred to as the "integrated ends-means" approach (Zahorik, 1975). The advocates of this approach, most notably McDonald (1965, 1973) and Eisner (1967) propose that teachers begin their planning by first focusing on the learning activity that will be provided for the student. Since according to this view, objectives arise and exist only in the context of teaching, they cannot be specified beforehand and only become visible as students choose their own learning experiences and pursue their own objectives. Thus, goals can only be stated as "expressive objectives" which describe the type of encounter that the learner is to have, but not what outcomes are to be.

Thus, teacher educators have a choice between, on the one hand, a view of planning that relies heavily on a rational and formal procedure of stating behavioral objectives, analyzing the task and attempting to optimize the teaching and learning encounter and, on the other hand, a view of planning that rejects this model as being too rigid, mechanistic, and unrealistic and proposes a more open, "expressive," statement of instructional goals. It is proposed here that the model of planning described in this study offers a middle road between these two views of planning.

A "Via Media": Planning as Intuitive Design

The model of the planning process described in this study embraces certain components of both the separate and integrated ends-means models while rejecting others. The purposefulness (goal directedness) of the rational model is retained, but its formal and mechanistic qualities are rejected. In the model of McDonald and Eisner, the

openness and expressive nature of the goals are accepted, yet their notion that objectives only arise individually within the activity is not included. The result is a model of teacher planning that portrays the activity as a progressive and sometimes intuitive process that begins with a vague, incomplete conception of the goal to be obtained (much like an expressive objective) and progresses through a systematic yet possibly idiosyncratic process of elaboration and development until a satisfactory solution is obtained.

In this view, planning is purposeful, yet the final outcome is not determined before the process begins. This gets around a major problem of the rational model created by the unpredictability and constant flux of the teaching environment, namely, the need to be able to predict ahead of time desirable and obtainable outcomes. This model also capitalizes on strengths of the integrated ends-means model. It allows for creativity and flexibility, reflects the complexity of the teaching endeavor, and provides for such potentially important non-instructional aspects of planning as the teacher's interest in the sytlistic and artistic qualities of his or her performance.

The view of planning resulting from this study should not be construed as a mere compromise between the two currently popular positions. In fact, it is consistent with both the oldest and newest thinking in curriculum planning. For instance, the early work by Tyler and Taba dealt with objectives in a much more general, developmental, and fluid context than is common today. Goals and objectives represented roads to travel rather than terminal points. In reference to formulating specific objectives, Taba (1962) states:

> It must be noted that at the point of planning a unit, probably neither the analysis of needs nor the formulation of objectives can be complete. Further clarification of objectives is to be expected at other steps of planning the unit (p. 351).

Thus, the use of the "total problem conception" as the goal component in the model of teacher planning may be a return to original propositions about goals and objectives before they were rigidified into a linear process by the instructional technology movement.

The present view of planning is also consistent with recent curricular thinking by Schwab (1969). He regards curricular and instructional planning as being in the realm of the "practical" (concerned with choice and action) while rational planning is in the realm of the "theoretic" (concerned with knowledge). Rational planning with its focus on objectives is too theoretical for practice; it provides too little of the concrete matter required for practical deliberation and is too difficult to carry out in its entirety.

The importance of practical deliberation is also suggested by Dewey (1922). His notion of deliberation as rehearsal (in imagination) of possible lines of action involves a view of decision making that integrates "reason" and "desire" (intuition). Rationality, according to Dewey, is not a force to evoke against impulse and habit. It is the attainment of a working harmony among diverse desires through deliberation. This suggests a view of the planning process that is not strictly bound by reason but that also includes intuitive components (habits, desires). This is very similar to the planning model proposed in the present study with its emphasis on progressive elaboration (through deliberation) and on the importance of intuitive knowledge and experience ("desire") and routines ("habit").

Although this notion of planning as intuitive design is only in a theoretical state, it does seem to have some value as a working hypothesis about current practice. It has been shown to be characteristic of at least one teacher's planning activities and conforms to a "principle of creative form making" that seems to be evident in similar deliberative planning tasks in other fields. In contrast, empirical studies of planning have revealed a conspicuous lack of the use of behavioral objectives even after their presence in training programs for over a decade. Eisner's (1967) argument against instructional objectives based on their disuse is persuasive:

> "Educational objectives should be stated in behavioral terms" has been elevated--or lowered--to almost slogan status in curriculum circles. Yet, despite these efforts, teachers seem not to take educational objectives seriously --at least as they are prescribed from above. If educational objectives were really useful tools, teachers, I submit, would use them. If they do not, perhaps it is not because there is something wrong with the teachers but because there might be something wrong with the theory (Eisner, 1967, p. 253).

On Eisner's side of the argument, however, there seems to be little empirical support for the effectiveness of the integrated ends-means model. The results of stating objectives in a general form or waiting for them to emerge from activities has not been studied.

Though the model proposed in this study seems to be a good working hypothesis about "what is" in teacher planning, the question still remains about "what should be." Proponents of the rational model and behavioral objectives argue that planning is better when their model is followed. The position taken here is that normative models of teaching and planning must be grounded on both the descriptive and the theoretical. Research needs to establish a dialectic between theory

and practice. Neither source is sufficient as a basis for prescriptive models of action. Schwab (1969) argues that theory unrealistically narrows the problem and deals with it abstractly. This of little value to the practitioner since he is not able to do this, but must operate with concrete instances in all their complexity. One cannot take the opposite stance and use current practice as the sole criteria. A problem with most practice is that once it seems to be functioning satisfactorally, other alternatives are rarely considered even though they may be more efficient or effective. Thus, theory and the wisdom of the practitioner must supplement each other through means of practical deliberation and reasoning.

Whereas the difficulty in making recommendations for teacher training based on this study involves the problems encountered when attempting to move from description to prescription, it appears that much of the previous work in planning has involved prescription not buttressed by description. The strategy adopted in this study follows practical reasoning in the Schwabian sense. It is grounded on "what is," on current practice that seems to be a successful adaptation to the demands and realities of actual planning situations. From here one may effect changes to improve practice in small progressions and in coherence with what is already known to be operating in the situation.

Suggestions for Teacher Training

The lack of empirical evidence in support of the prescriptive models of teacher planning does not release these comments from the difficulties of the description-to-prescription dilemma. What "is" is not always what "should be." However, as mentioned in Chapter I, a

rationale adopted by this study is that models of planning based on what is possible in the classroom will, in the long run, be more effective than models borrowed from other fields that are too difficult or complex for teachers to implement. In other words, what "should be" should be based on what is "possible." The findings of this study reflect what is possible (and effective) for at least one experienced teacher and evidence for the planning model from other fields suggests that it may be possible for other teachers as well. Nevertheless, the following suggestions should be viewed in the context of the limited (and eclectic) data base on which they are grounded.

Five suggestions for teacher training in planning are generated by this study. First, it is proposed that planning be emphasized as an important teaching activity which may help the classroom teacher deal with the complexity and unpredictability of the classroom teaching situation. It may be that planning is one activity in which a preactive investment of time and energy can have enormous interactive payoffs. It should be emphasized that planning does not necessarily restrict or predetermine all aspects of classroom activity, but rather that it can increase teacher flexibility and spontaneity by decreasing the number of structural and behavioral concerns that a teacher must consider and decide upon during class.

Second, the purposefulness of the planning activity should be emphasized while tempering the mechanism and formalism associated with behavioral objectives. It may be that behavioral objectives are beneficial and feasible for some activities. However, it may also be that an attempt to follow the rational model for all teaching endeavors becomes an unworkable and discouraging approach for most teachers. The

formality and tedium involved in specifying behavioral objectives for endless activities may be the reason that the baby (goals) has been thrown out with the bathwater (behavioral objectives) by many teachers.

This study suggests that planning is necessarily purposeful, but that the specification of detailed objectives is not always desirable or possible given the openness and the dynamic quality of the teaching task. It may be that the creative and artistic qualities of teaching that have been quashed and silenced by the technological view of instruction may need to be resurrected and discussed with less embarrassment in the future training of teachers. The trend towards characterizing teaching as a clinical activity suggests the importance of the intuitive, artistic, and experiential aspects of the teaching process.

The third suggestion for teacher training is that the potential effectiveness of teaching routines should be pointed out to pre-service teachers. Often the word "routine" carries with it a negative connotation of inflexibility. The description of Mrs. Lisa's teaching suggests that routines can be effectively used in the classroom to improve and simplify both planning and actual teaching. Routines can simplify the planning task by reducing the need to plan each new activity from "square one." Routines can increase the effectiveness of in-class time by increasing the stability of activities and reducing time lost to interruptions. They can also increase student time on task by increasing the predictability of activities and possibly reducing the students' anxiety about what will happen next and what will be expected of them. It is likely that routines are a common tool of experienced teachers, but Hudgins (1971) is the only educator to encourage their use to pre-service teachers.

A fourth suggestion for training resulting from this study is that more time be spent on higher levels of planning. Generally, most materials for planning skills training focus on lesson planning. In some cases, suggestions for unit planning are made. However, even in student teaching, unit and lesson planning are the only levels with which pre-service teachers usually gain experience. It may not be until the first year of teaching that yearly or term planning is confronted, and this skill may be only picked up through trial and error or through the mercy of a more experienced colleague. In fact, during the study, Mrs. Lisa commented that the lack of training in these areas was a major problem during her first year in teaching. She also mentioned that she has repeatedly seen this need in new teachers whom she has consulted.

This need leads into the fifth suggestion for training, that of providing more practice to new teachers at all levels of planning. Simulations such as the Teacher Planning Shell might be an effective means for accomplishing this. Students could be given a simulated class and asked to plan for different lengths of time. Various aspects of the environment could be changed and students would be able to see how these modifications affect or should affect their plans. A repertoire of teaching situations and problems could even be programmed into a computer which could give students feedback based on the planning decisions that they make. This could be a valuable supplement to student teaching experiences since students could gain some experience dealing with the portions of the year when they were not in a classroom. The planning model proposed in this study and research on planning in other fields suggests that the greater the experience that the

practitioner gains and the more information that is brought into the task, the more efficient and effective is the planning process. Thus, the more experience students can gain through simulations or actual classroom practice, the easier and more effective their first experiences may be.

Chapter Summary

The purpose of this chapter was to discuss the findings and results of this study and to present some implications for future research and teacher training. First, the results of this study were compared with those of previous studies of teacher planning. Mrs. Lisa's emphasis and concern about activities, the absence of behavioral objectives, the form of her plans, and the lack of specified alternatives in planning were a few of the results of this study that agreed with earlier findings. Next, the methods used in the study were discussed. The advantages and disadvantages of the ethnographic analysis, the process tracing analysis, and the simulation and judgment tasks were each described in the context of the study. After that, implications for future research were presented in the form of research questions regarding the technology of the teaching process, the structural model of preactive planning, and the process model of teacher planning. Finally, implications for teacher training were presented. The model of teacher planning described in this study was discussed in light of current prescriptive planning models and five suggestions for teacher training were offered.

CHAPTER X

SUMMARY AND CONCLUSIONS

Summary

The major purpose of this study was to investigate teacher planning by means of a detailed examination and description of the decision processes involved in one elementary teacher's planning during a five month period of instruction. The rationale for the study was based on the fact that most studies of teaching have overlooked or ignored that portion of teaching that occurs before students arrive at and after they leave school. Also, it has been suggested that this "preactive" phase of teaching is where the teacher is most likely to be able to function in the deliberative manner of a problem solver or decision maker. It was hypothesized that planning may be one of the most important activities carried out in the "empty classroom" and that it may serve as the bridge that facilitates teachers' movement from the complex and unpredictable environment of the classroom to effective and efficient management of instruciton.

A review of the planning literature both in and outside of education showed it to be dominated by theoretical and prescriptive dicta. Education seemed to have borrowed a rational model of planning from economics and from national and city planning theories. The same model was shown to be prescribed for all types of ecucational planning endeavors from comprehensive curriculum planning to daily lesson planning.

Empirical studies of teacher planning were shown to be few in number and limited in scope. To date, no study of teacher planning had attempted to examine and describe teacher planning behavior in the classroom over an extended period of time. Also, none of the earlier studies focused on the information processing involved in planning. In short, the potential importance of teacher planning for effective teaching, the potential for portraying planning as decision making, and the lack of knowledge about how experienced practitioners actually plan were the central reasons for pursuing this study.

The superficiality and artificiality of previous studies of teacher planning indicated a need for an in-depth study of planning as it occurred in the classroom over an extended period of time. For this reason, it was decided that one teacher would be observed and described in as detailed a manner as possible. The method chosen for doing this involved a mixture of the participant observer strategy common to ethnographic studies in sociology and anthropology and the process tracing strategy shown to be effective in studies of problem solving and decision making in the laboratory and in restricted field settings. In addition, several judgment tasks and a new simulation task, the Teacher Planning Shell, were developed to attempt more controlled mini-experiments in the field.

The teacher chosen for the experiment, Mrs. Lisa, was teaching in a first and second grade combined classroom in a local school district. This was her sixth year of teaching, three in special education and three in a first/second grade split. She was in her early thirties and was highly regarded by her fellow teachers.

The study began in January and concluded in May of 1977. During the first three months of the study, the investigator was in the classroom an average of four days per week. During these days all aspects of the teacher's day were observed and recorded as the investigator "shadowed" her from 8:30 in the morning until she left school at 4:45 in the afternoon. The fourth month of the study involved occasional visits to the classroom while the data were being analyzed and while the models were being formulated. The fifth month involved several more weeks of observation and the administration of the judgment tasks and the Teacher Planning Shell.

The field observations showed Mrs. Lisa to be a very organized teacher whose planning and teaching "technology" was dominated by instructional activities and teaching routines. Activities were the basic structural unit of Mrs. Lisa's planning and instruction. They functioned as controlled behavior settings that Mrs. Lisa could shape to conform with her perceptions and purposes. Action in her classroom seemed to be either within these activities or related to their preparation. Seven features of instructional activities were identified and used as a basis for describing the character of Mrs. Lisa's teaching. They included: location, structure and sequence, duration, participants, acceptable student behavior, instructional moves, and content and materials.

Teaching routines were portrayed as a dominant figure in Mrs. Lisa's teaching, so much so that it was proposed that her planning chiefly involved the selection, organization, and sequencing of routines. Four types of routine were identifed in Mrs. Lisa's teaching. Activity routines functioned to control and coordinate the components

of instructional activities mentioned above. It was found that by winter term, eighty-six percent of Mrs. Lisa's activities were so routinized that they required little or no planning and little set-up or management effort when being taught. Instructional routines were methods and procedures (strategies) established by the teacher for carrying out specific instructional moves. Management routines were established procedures for controlling and coordinating classroom organization and behavior not associated with specific activities. Executive planning routines were proposed as a system of established thought patterns (cognitive strategies) set off by specific planning tasks and used to call upon and implement the three other forms of routine. Each of these types of routine was discussed as a means for increasing Mrs. Lisa's teaching effectiveness and flexibility in both planning and instruction.

The findings of the study pertaining to decision making in planning were summarized by two models of the planning process. The first model was a structural model of preactive planning. It portrayed Mrs. Lisa's planning as occurring within a hierarchical structure composed of five levels of planning, each having a different scope. The five levels portrayed in the model were: (1) yearly planning, which is concerned with sequencing and organizing teaching for the whole school year, general materials, and pupil placement; (2) term planning, which centers on activities that will occur within the next twelve-week period; (3) unit planning, which involves developing an instructional unit for a specific subject matter; (4) weekly planning, which focuses on activity that will occur as part of the schedule on Monday through

Friday; and (5) daily planning, which involves the last-minute modifications or preparations that must be made before school starts the next day.

For each planning level, the goals for planning, the information sources, the form of the plan, and the criteria for judging plan effectiveness were described. Also, the connections and interactions among levels were discussed for six strategic times during the year. It was proposed that this type of analysis is important as a means of identifying strategic research sites for future investigation, to provide additional information about details of the decision process, and to describe the nature and degree to which planning activities differ.

The second model was a theoretical model of teacher preactive planning. The model had two major purposes: (1) to describe and represent in a schematic form speculations about the components of teacher's planning and their interrelationships, and (2) to serve as a basis for further theory and research on teacher planning.

The process model was grounded on three data bases. The first was the data collected in the field research portion of the study. This source provided the unit of analysis and the basic characteristic of Mrs. Lisa's planning process. The second source of data was previous students of teacher planning. The third source of data was psychological studies of problem solving and planning conducted in similar deliberative situations in mathematical problem solving, chess playing, musical compositon, art, and architectural design. These studies provided some of the terminology of the model and more detailed descriptions of certain planning processes.

The focus of the model was individual, preactive, deliberative planning for instruction. It deviated from traditional models of planning in that the emphasis was on the discovery and design processes in planning rather than on the choice processes. In short, the model portrayed planning as "purposeful problem solving" as opposed to "rational decision making."

Three stages of teacher planning were represented in the model. The first stage was called problem finding. The need for this stage arose from the nature of the planning problem situation: rather than having problems presented to them, most planners must interact with the planning dilemma and discover those problems needing specific planning. The model portrayed this process in terms of a discovery cycle. Here, problem finding takes place as the teacher's goal conceptions, her knowledge and experience, her notion of the planning dilemma, and the materials available for planning interact. The product of this process is an initial problem conception worthy of further exploration.

The second stage in the planning process was problem formulation and solution. The mechanism proposed for carrying out this process was called the design cycle. In this cycle, problem solving is characterized as a design process involving progressive elaboration of plans or activities over time. The design cycle contains three phases. The first, the elaboration phase, is the construction phase of the design cycle. Elaboration involves the detailing and solution of subproblems by means of the application of elements or routines stored in memory ("means actualization") or by applying new features or elements ("means abstraction"). These subproblem solutions are then fed into the second phase of the design cycle, investigation. Investigation

involves the analysis of the elaborations to determine their workability (success or failure) as subproblem solutions. It takes place by means of automatic and routine checking processes or through mental "trying out" involving the visualization or projection of the solution into the teacher's current teaching situation. Based on the results of this investigation, the third phase of the design cycle, adaptation, takes place. The adaptation is in effect the beginning and end of the cycle. In this phase the development, transformation, and completion of the total problem conception occurs. Results of previous elaborations are integrated into the total problem conception. On the basis of this transformed problem, new subproblems are generated for further elaboration. This cycle of elaboration, investigation and adaptation continues until the problem conception is completed and the state of the solution meets the aspiration level set as part of the original total problem conception. The product of this cycle is a planning problem solution (a plan, activity, schedule, etc.) that may be carried out.

The third stage of the planning model involved implementation, evaluation, and routinization. In this stage the problem solution is implemented and evaluated in the classroom. If, after a period of time, it is not workable, it is submitted to further planning (by the means of a return to the design cycle) or on rare occasions it is rejected. For most successful activities, they become established in the classroom by means of routinization. Whatever the outcome of the plan or activity, it becomes part of the teacher's repertoire of knowledge and experience that will play a major role in future planning.

The findings of this study, although of a different scope and emphasis, seemed to be in general agreement with those of earlier studies. Mrs. Lisa's focus on activities, the absence of behavioral objectives in her planning, the format of her plans, and the lack of specified alternatives were several findings of this study that agreed with the results of earlier investigations. The models generated in the study had no previous body of data or theory to which they could be compared, but they did serve as a basis for many research questions to be pursued in the future. In evaluating the methods used during the study, it was found that the techniques of ethnography and process tracing were not perfectly compatible with the task confronting them, but that they did function well enough to produce valid and useful results. Finally, based on the findings of this investigation, implications for teacher training in planning were discussed which led to five suggestions for future practice.

Conclusions

In Chapter I, nine research questions were posed as objectives for this study to address. The answers to these questions will be briefly stated as a way of summarizing the results and conclusions of this study. The first five questions address process; the next four are related to method.

1. What different kinds of planning decisions does the teacher make?

   Mrs. Lisa's planning decisions were shown to be primarily concerned with activities. The features of activities listed in Chapter V represent subproblems concerned with location, structure and sequence, duration, acceptable student behavior, instructional moves,

and content and materials. The structural model is another way of distinguishing Mrs. Lisa's planning decisions. Although the underlying process was essentially the same across levels, her planning could be investigated in terms of categories, such as yearly planning decisions, term planning decisions, unit planning decisions, and so forth.

2. What are the relationships, if any, among these decisions? As alluded to in the previous questions, planning decisions have both structural and process relations. Decisions about activity location, structure, etc., are related as subproblems of decisions about the structure of activities. Decisions at different levels of planning seem to be related by the hierarchical nature of the planning structure. Process relationships run throughout levels and subproblems since it is hypothesized that the design process is similar across levels and problems.
3. What information or cues are gathered to make planning decisions? The information sources used by Mrs. Lisa at various planning levels were described as part of the structural model in Chapter VI. In general, four major sources were tapped by Mrs. Lisa for her planning decisions: students, materials and resources, the classroom and school environment, and her teaching knowledge and experience. Each of these sources was represented in Stage 1 (problem finding) of the process model in Chapter VIII and specific cues were listed at each level in the structural model in Chapter VI.

4. What is the major "unit" or element that the teacher thinks about when planning? It is obvious from this and previous discussions that the "activity" dominated Mrs. Lisa's thinking in both planning and teaching.

5. What are the general strategies and processes of the teacher's planning and how might these processes be represented in a decision model? Answering this question was the purpose of Chapter VIII which produced a model of the planning process quite different from previous models. Planning was portrayed as a problem solving process dominated by problem finding and an intuitive design process.

6. How useful are ethnographic methods for studying classrooom decision making? On the basis of this study, it can be said that the intensive field observations that characterize this method played an essential role in producing the results of this study. This mode of inquiry made possible the discovery and description of aspects of the environment and Mrs. Lisa's planning behavior that probably would not have resulted from a less intensive investigation.

7. What is the usefulness of "process tracing" methods such as Clarkson's (1962) for modeling teacher decisions? Expectations to produce detailed decision tree representations such as those produced by earlier studies were disrupted by the complexity and duration of Mrs. Lisa's planning decisions. The "thinking aloud" procedure used in this method was, however, very useful in producing verbalizations of Mrs. Lisa's thoughts as they occurred in actual planning decisions.

8. What are the advantages and limitations of various structured and unstructured methods for collecting planning data in the preactive phase of planning? Several informal data gathering techniques proved to be very useful in this study. As a collegial relationship developed between the teacher and the investigator, these informal methods were readily accepted by the teacher. Informal procedures that were not initially planned as part of the study included the "stimulated recall" involving a restructuring of her fall planning using her lesson book, the sociogram analysis task mentioned in Chapter III, and Mrs. Lisa's diary of her planning time spent at home. These specific methods were supplemented by numerous informal interviews throughout the study. It may be an additional advantage of the ethnographic approach that as a researcher becomes a participant in a social situation and begins to develop relationships with the participants (the subjects), additional methods and tactics that are unobtrusive yet effective become more easily visible.

9. How successfully can a "moderate fidelity" judgment or In-Basket type task be used to supplement preactive and interactive classroom data collection strategies? The intensive data collection that preceeded these activities may have biased the answer to this question in this study. Generally, these tasks provided no new information about the planning process per se. They did, however, expand the information collected about pupil and activity characteristics most salient to Mrs. Lisa. The concept of the Teacher Planning Shell seemed to be effective and, with some modifications in the problems to be presented to the teacher, it is anticipated

that it could be a useful and efficient tool for gathering information about teacher planning processes.

Finally, it is felt that the secondary goal of this study of formulating question for further research through the generation of hypotheses and models has been acheived to an unexpected degree. The complex tapestry of planning and teaching that this study has only partially represented has revealed many new ideas and questions that need to be followed up by further study. Also, notions of teaching as a fairly simple, straightforward enterprise have been further dispelled by revealing the intricacies of the teaching environment and the variety of cognitive skills brought to bear by the experienced practitioner. This provides support for the claim that research on teaching must continue to examine the "wisdom of the practitioner" as it is developed and functions during teaching in real classrooms.

APPENDICES

APPENDIX A

TEACHER PLANNING SHELL MATERIALS

TEACHER PLANNING SHELL--INTRODUCTION

This is a simulation of teacher planning. We are interested in studying the planning that you are doing at the present time with your present class. Because of this interest, we will not do what most simulations do; that is, put you in a situation with a simulated school, classroom, and pupils. Rather, we are going to give you problems that might feasibly happen to you tomorrow, and we want to see how these situations affect your planning.

Your main task in this simulation is to assume that the situations we give you have really happened and that you have to deal with them starting right now. Think about what you would do this time of year and with your current students. We have chosen the problems that we will give you because of the potential effect that they have have on planning. Some problems may be more feasible and realistic than others for your current teaching situation, but you never know what may happen next in teaching!

All of the problems will ask you to do some planning for a specific period of time. We want you to plan as you normally do. There are no "correct" ways of planning that we are looking for, so feel free to do as little or as much planning as you typically do. The only thing that you probably don't typically do when you plan that we want you to do during the simulation is to talk out loud. We call this "thinking aloud" and all you have to do is verbalize the thoughts that come to mind as you plan. This is not as hard as it sounds, and we will provide a short practice exercise for you before the first problem.

Remember, there are no "right" or "wrong" things to say or do when you are planning and "thinking aloud." We consider you an expert in this area, and we are interested in learning all that we can from the "practical wisdom" that you have picked up during your teaching career.

Do you have any questions?

TEACHER PLANNING SHELL--PROBLEM 1

You have just returned from your weekly staff meeting at which the principal informed you that because of drastic cutbacks in the district budget, they have decided to cut back money available for support staff in schools. Among other things, this means that as of a week from Monday, you will no longer have an aide to help you in the classroom. Please plan your activities for the first week that your aide is gone.

TEACHER PLANNING SHELL--PROBLEM 1a

It is after school. You aide has just told you that they have found a larger house across town, and she and her family will be moving out of the district in two weeks. The principal calls you down to his/her office to tell you this news that you already know and informs you that because of the time involved in hiring someone else, you will be without an aide for at least two weeks. Please plan your activities for the first week that your aide is gone.

TEACHER PLANNING SHELL--PROBLEM 2

This morning before school, you were running off some dittos for your class and ran out of paper. Upon checking the storeroom, you find that there is no more ditto paper in the school. You tell the secretary and this afternoon the principal sends around a memo informing all the teachers that because of poor calculations and over use of supplies, the school has exhausted its budget for supplies. This means that for the remaining weeks of school, there will be no paper available for running off dittos for your class. Please indicate how you will adjust your plans because of this inconvenience.

TEACHER PLANNING SHELL--PROBLEM 3

For the last three or four staff meetings, the teachers at your school have been discussing the need for improving the _____ curriculum in your building. A committee of three teachers was appointed to look over available programs and has just recently reported back recommending the _____ program. As a staff, you have decided that even though this program has been successful in other schools in your district, it would be a good idea to pilot these materials before committing a lot of time and money to implementing it. The staff has agreed to try out the materials in their classrooms for a period of two weeks. Given these materials, how would you plan to use them during the pilot period?

b) Number of classes at each level

Kindergarten_____
grade 1_____
grade 2_____
grade 3_____
grade 4_____
grade 5_____
grade 6_____
Other (indicate splits or other groupings)__ __ _____

TOTAL NUMBER OF CLASSROOMS_____

c) Classroom organization (check those that apply)

self-contained_____
team teaching_____
department_____
Joplin_____
non-graded_____
Other__ __ __ __ __ _____

If more than one plan is checked, indicate your classroom organization here_____

13. School administrator

Briefly describe your principal (touching on such things as personality, educational knowledge, helpfulness, approachability, supportiveness, etc.)

14. Generally, how would you describe the other teachers with whom you work closely? (e.g., experience, knowledge, attitudes, etc.)

TEACHER PLANNING SHELL--PROBLEM 4

Early this morning you received a call from your principal telling you that there was a fire at the school last night and because of the damage there will be no school for today, but he would like you to come in to help assess the damage. Upon arriving at school, you find that the fire has done extensive damage to several of the rooms, but yours was fortunately not one of them. Because of the extent of the damage and the enormous clean up involved, it is decided to cancel school for the rest of this week and all of next week. Because of the special nature of the problem, you have been told that this time will be lost and not made up at the end of the year. Please revise your plans for the first week when you come back to school.

TEACHER PLANNING SHELL QUESTIONNAIRE

The following questions will help us in preparing for and interpreting your participation in this classroom planning simulation. The purpose of these questions is to provide us with some background information about your school, classroom, students, and teaching.

We realize it would be an enormous task to ask you to relate all of what you know about your current teaching situation. It may be helpful in deciding what information is most important if you imagine this questionnaire to be your only communication with a new teacher who will be taking over your job next week.

Please respond to every question. All answers will be treated as confidential and will be used for research purposes only.

PART I Background Information

1. Name_____

2. Name and Address of School_____

_____

3. Sex (check one)
   - Male_____
   - Female_____

4. Age (check one)
   - Under 30_____
   - 30-39_____
   - 40-49_____
   - 50-59_____
   - Over 60_____

5. Graduate training

Masters_____
Specialist_____
Other__ __ __ __ __ __ _____

6. Years of experience

At Kindergarten_____
At grade 1_____
At grade 2_____
At grade 3_____
At grade 4_____
At grade 5_____
At grade 6_____
Other__ __ __ __ __ __ _____

TOTAL _____

PART II Neighborhood and school

7. Ethnic composition of neighborhood

Percent White_____
Percent Black_____
Percent Chicano_____
Percent other__ __ __ __ _____

8. Type of neighborhood (check one)

New_____
Transition_____
Decaying_____

9. Type of dwellings (check one)

Primarily rental_____
Primarily own homes_____

10. Locale

Primarily urban_____
Primarily rural_____

11. In what ways is the community or neighborhood involved with the school?

12. School building

a) Physical facilities

Old_____
Renovated_____
Modern_____

PART III Class and Classroom

15. Number of pupils in your class

Boys_____
Girls_____
TOTAL_____

16. How does this number compare to previous years? (check one)

More_____
Fewer_____
Same_____

17. Think of your class as a whole. What kind of "group" is it?

18. Describe briefly several of your present students who give you the most difficulty in the classroom (your "problem" students). (A first name followed by "descriptive words" would be sufficient for our purposes.)

19. Describe briefly several students whom you would classify as "good" or "successful" students.

20. In the following space, sketch roughly the floor plan of your classroom (e.g., general location of doors, windows, teacher's desk, student desks, blackboards, reading centers, science or art centers, etc.). If several different layouts are used, describe when and how you would make these changes.

21. What restrictions do you feel in this classroom?

22. What restrictions do you feel in other school facilities such as the gym, library, etc.?

PART IV Curriculum and organization

23. Who primarily chooses the curriculum materials that you use for:

Reading?_____
Math?_____
Science?_____
Social Studies?_____
Language Arts?_____
Other__ __ __ __ ?_____
__ __ __ __ ?_____

27. On the following weekly schedule, please fill in the activities that occur during a typical week (also include those activitis that are fixed, such as lunch, recess, library time, etc., specifying when they typically begin and when they end). We realize no week is the same, but we are concerned with the general weekly framework in which you work.

	AM	PM
MONDAY		
TUESDAY		
WEDNESDAY		
THURSDAY		
FRIDAY		

28. Do you think that following a schedule or routine is important?

yes_____

Why? no_____

24. Please specify the materials that you are primarily using this year.

SUBJECT	NAME OF SERIES OR MATERIALS	USING TEXT?	USING WORK-BOOK?	USING DITTO MASTERS?	OTHER? PLEASE SPECIFY
Reading					
Math					
Science					
Social Studies					
Lan-guage Arts					
Social Emo-tional					
Other					

25. What human resources, such as aides, parent volunteers, specialists, etc., are available to you? For what days and activities?

26. What are the primary resources outside the classroom that you take advantage of? Estimate the number of minutes per week you use each resource.

PART V Planning and teaching

29. What different "types" of planning do you do? Please describe.

30. How do you typically do your planning for each of the "types" mentioned above?

a) How far ahead?

b) What format do you use? (e.g., outline, detailed written plans, etc.)

c) When do you typically plan?

31. Why do you plan? What are some reasons for the types of planning you use?

32. What restrictions or influences on your planning do you feel from administrators?

33. List from five to ten words that would describe your teaching "style."

34. What do you find to be the biggest rewards in teaching your present class?

35. What do you find to be the biggest frustrations in teaching your present class?

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE

If you have any further comments on any question or if you feel that there are any important facets of your classroom planning and teaching that we have overlooked, please use the space provided below.

APPENDIX B

JUDGMENT TASK RESULTS AND MATERIALS

Pupil Sort Dimensions Generated by Mrs. Lisa

Dimensions (listed in order generated)	Number of Levels
Neatness	4
Coordination	3
Imagination skills	3
Enjoyment of academic work	2
"Talkers"	3
Remembering "station tags"	2
Maturity	2
Organization	2
Like to read on their own	2
Reading during U.S.S.R. (assigned silent reading)	3
"Needing to be first"	2
Will succeed later in school	3
Academic potential	2
Reading comprehension skills	3
Sports interest	3
Math ability	3
Interest in how they do	3
Memory (remembering)	3
Empathy towards others	3
Tattlers	3
Ability to solve own problems	3
Reading ability	3

Activities Sorted by Mrs. Lisa during the Activity Sort Judgment Task

Book reports
Library
Phonics workbooks
Read-a-story (student reading to class)
Reading folders
Reading groups
Reading lab
Silent reading (in readers)
Story reading (teacher reading to class)
U.S.S.R. (uninterrupted sustained silent reading in library books)
Math games
Math quizzes
Math units
Math workbooks
Calendars (first of month)
Creative writing
Decoding (spelling)
Finding mistakes in schedule
Handwriting workbooks
Letter writing (classroom post office)
Mindbender
Newspaper (class newspaper)
Orange suitcase (grammar)
Pencil pals
Remedial handwriting group
Spelling bee
Spelling folders
Spelling test
Word contest
Social studies units
Snoopy books
Snoopy snews
Weekly reader
Science units
Art in room
Art with art teacher
Assembly
Block patterns (memory)
Change jobs
Choice time
Cooking
Directions (listening)
Field trip
Gym
Music with music teacher
Pass out papers (returning graded papers)
Station work
Bucket check (desk clean-up)
Holiday party
Movies (Friday p.m.)
Treat

Activity Sort Dimensions Generated by Mrs. Lisa

Dimensions (listed in order)	Number of Levels
Fun to teach	2
Activities that take long range planning	2
Activities done in fall	2
Activities done in winter	2
Activities done in spring	2
Activities planned in summer	2
Activities for which first and second grade objectives need to be combined	2
Activities on which more time is spent in the fall	2
Activities emphasized in winter	2
Activities emphasized in spring	2
Activities in schedule that are not a necessity (there by preference)	2
Activities that would be included if she taught third grade next year	2
Activities she would change next year (because they didn't go as well as she liked)	2
Activities she can "pull off the top of her head" (not requiring planning)	2
Activities that she can be creative with when teaching	2
Activities that a majority of the students like to do	2
Activities affecting room arrangement or requiring a special set-up	2
Activities for which films or film strips are available	2
Activities done in the room	2
Activities for which planning is influenced by students	2

Sociogram Questions

1. What person would you choose to sit by?
2. Who would you choose to walk with on a field trip?
3. Who would you choose to sit with on a field trip taking a bus?
4. If you had one candy bar, who would you choose to share it with?
5. If you were playing "7-Up," who would you choose to tap on the head?
6. If you were racing, who would you choose to race against?
7. Who would you choose to work with on a word contest?
8. Who would you choose to work with on your math?
9. Who would you choose to work with on your reading?
10. Who would you choose as your two best friends?
11. Who would you choose as your one best friend?
12. Who would you choose to play with after school?
13. Who in school would you like to be instead of yourself?
14. Who would you choose as the quietest person in the class?
15. Who would you choose as the most helpful person?
16. Who would you choose as the best liked person?
17. Who would you choose as the person most willing to share?
18. What three people would you choose to play with during recess?
19. Who would you want on your team in kickball?
20. Who would you choose to be a "teacher" to judge your work?

APPENDIX C

AN OUTLINE OF THE DISTRICT OBJECTIVE BY SUBJECT MATTER. PERFORMANCE OBJECTIVE LISTED IN EVALUATION AND REPORTING FORMS

An Outline of the District

Objectives by Subject Matter

READING

A. Attitudes toward reading.
   1. Possesses a positive self concept toward reading.
   2. Shows a willingness to perform assigned reading tasks.
   3. Pursues reading actively on his own.

R. Reading Readiness

R.1. Vocabulary
   a. Recognizes words.
   b. Uses pictures to derive word meanings.

R.2. Perceptual Skills
   a. Uses auditory skills.
   b. Uses visual skills.

R.3. Comprehension
   Derives meaning from pictures and stories read aloud.

R.4. Oral Expression
   Exhibits self expression.

1. Reading Vocabulary
   Reads and uses vocabulary consistent with his grade level.

2. Comprehension
   a. Demonstrates literal comprehension of reading at his grade level.
   b. Demonstrates interpretive and/or inferential comprehension at his grade level.

3. Word Attack
   Phonetic analysis (Using phonetic skills to decode words.)
   a. Uses consonant sounds to decode words.
   b. Uses short vowel sounds to decode words.
   c. Uses consonant blends to decode words.
   d. Uses long vowel sounds to decode words.
   e. Uses consonant diagraphs to decode words.
   f. Uses vowel diagraphs to decode words.
   g. Uses "r" controlled vowels to decode words.
   h. Uses diphthongs to decode words.

i. Uses silent letter combinations to decode words.
j. Uses hard sounds of "c" and "g" to decode words.
k. Uses soft sounds of "c" and "g" to decode words.
l. Uses schwa sound to decode words.

4. Structural Analysis (Using word structure to derive meaning)
   a. Identifies common word families to derive meaning.
   b. Identifies word endings to derive meaning.
   c. Identifies compound words to derive meaning.
   d. Identifies contractions to derive meaning.
   e. Identifies root or base words to derive meaning.
   f. Identifies prefixes and suffixes with root or base words to derive meaning.
   g. Uses syllabication.
   h. Uses pertinent phonetic skills and structural analysis to decode unknown words.

5. Oral and Silent Reading
   a. Uses oral reading as a means of expression at his grade level.
   b. Uses silent reading to comprehend reading materials at his grade level.
   c. Uses appropriate rate with oral and silent reading.

WRITING SKILLS

A. Attitudes toward Writing Skills

1. Demonstrates higher levels of self-confidence in his writing.
2. Willingly accepts writing assignments.
3. Pursues writing activities on his own.

1. Sentence Sense:
   Varies sentence length and structure correctly.

2. Punctuation:
   Punctuates sentences correctly.

3. Capitalization:
   Uses capital letters correctly.

4. Handwriting:
   Demonstrates effective handwriting skills.

5. Word Usage:
   Writes sentences which are in agreement.

6. Types of Writing:
   Uses various types of writing.

7. Writing Format:
   Uses appropriate organization and form in written work.

8. Literary Devices:
   Uses appropriate literary devices.

9. Word Structure:
   Modifies root words.

10. Proofreading:
    Consistently proofreads and corrects his own writing.

11. Spelling:
    Spells approximately 75% of functional words at his grade level.

MATH

A. Affective Outcomes: Goals and attitudes to faciliate math program.

   1. Demonstrates self-confidence toward math.
   2. Demonstrates willingness to complete required math assignments.
   3. Pursues math activities on his own.

1. Sets
   a. Classifies objects into sets.
   b. Uses numerals to demonstrate understanding of numbers.
   c. Demonstrates initial understanding of basic set theory.

2. Place Value
   Uses place value correctly.

3. Whole Number operations
   a. Adds numbers.
   b. Subtracts numbers.
   c. Multiplies numbers.
   d. Divides numbers.
   e. Solves story problems.

4. Fractions
   a. Demonstrates understanding of the meaning of fractions.
   b. Adds fractions.
   c. Subtracts fractions.
   d. Multiplies fractions.

5. Decimals
   a. Demonstrates understanding of the meaning of decimals.
   b. Adds and subtracts decimal fractions.

6. Measurement
   a. Uses tools to measure. (Geometric)

b. Uses tools to measure. (non-Geometric)

7. Geometry
   a. Demonstrates an understanding of different shapes, points, lines, congruency, and symmetry.
   b. Constructs geometric models.

8. Ratio and Proportion
   Demonstrates an understanding of the use of ratio and proportion.

9. Signs, Symbols, and Laws (Algebra)
   a. Uses signs and symbols correctly.
   b. Uses laws and function rules correctly.

10. Graphing and Charting
    Collects and records information using charts and graphs.

SOCIAL STUDIES

A. Understanding Self

1. Awareness and/or acceptance of self.
   Gives evidence of positive self concept. (A)
2. Awareness of the unique qualities of human organisms.
   a. Recognizes physical similarities and differences among organisms.
   b. Identifies human needs and feelings.

3. Understanding influence of social and physical environment on self-perception and behavior.

Social Environment:

3. Human Interaction
   a. Identifies human interaction and resulting effects on behavior.
   b. Distinguishes between positive and negative aspects of groups.
   c. Demonstrates understanding of systems as composed of interactive subsystems that can be organized to meet its goals.

4. Socialization
   a. Demonstrates an understanding that individual and social behavior is learned.

5. Need for Structure or Organization
   a. Demonstrates understanding of the need for rules within a social order.

b. Demonstrates understanding that rules or laws contribute to the well-being of both individuals and society in general.

6. Multi-ethnocentrism
   a. Compares and forms generalizations regarding cultural subcultural similarities and differences.
   b. Generates examples of cultural/subcultural influence and/or interdependency

7. Acceptance of Others
   a. Demonstrates he/she is sensitive to the feelings, attitudes, and/or values of others. (A)
   b. Demonstrates acceptance of others. (A)

Physical Environment:

8. Man's Use and Misuse of Environment
   a. Describes how physical conditions influence the way an organism lives.
   b. Generates examples of how man's basic needs have been met through manipulation of environment.

9. Economic Choices
   a. Demonstrates awareness of making consumer decisions.
   b. Demonstrates understanding of factors influencing how man meets his economic needs.

C. Understanding influence of change on self-perception and social behavior.

10. Societal Change
    Describes ways self perception and social behavior are influenced by change.

D. Demonstrates skills in communicating and/or processing social science data.

11. Processing Information
    a. Communicates ideas effectively.
    b. Classifies information.
    c. Employs effective problem-solving strategies.
    d. Reads maps.

SCIENCE

A. Attitudes toward Science
   1. Demonstrates self-confidence with respect to science.
   2. Conveys enthusiasm for science activities.
   3. Pursued science activities on his own.

1. Observing
   Observes and describes various life and physical phenomena.

2. Classifying
   a. Distinguishes between objects or sets of objects characterized by specific properties.
   b. Classifies organisms in certain fundamental ways.

3. Understanding basic science concepts
   Demonstrates understanding of specific concepts in science.

4. Explaining
   Presents explanations of scientific phenomena based on direct observation.

5. Measuring
   Demonstrates ability to use measuring and recording instruments.

6. Inferring and processing of information.
   a. Cites evidence to support the conclusion that a given phenomena has occurred.
   b. Forms inferences from direct observation and/or recorded data.
   c. Forms and/or tests hypotheses.
   d. Plans and/or conducts exploratory activities.

7. Applying scientific skills
   Applies knowledge of scientific processes to solve a specified problem.

Performance Objectives Listed

In First Grade Evaluation and Reporting Forms

READING

Knows the sounds of the consonants
Uses beginning consonants to read words
Uses ending consonants to read words
Identifies words which rhyme
Hears and differentiates between short and long vowels
Uses ch, sh, th, wh, to sound out words
Recognizes compound words
Identifies and uses word endings (s, ed, ing)
Can read contractions
Is developing an appropriate sight vocabulary
Uses context to identify words and meanings
Reads orally with expression
Comprehends reading material
Possesses a positive self-concept toward reading
Enjoys doing assigned reading tasks

COMMUNICATION SKILLS

Speaks distinctly
Writes simple sentences with correct punctuation
Forms letters legibly and correctly
Spells adequately at own level
Uses capital letters correctly
Listens attentively when others speak

MATH

Uses sets correctly for matching or comparing objectives
Uses place value correctly (ones and tens)
Adds 2-place numbers accurately (without borrowing)
Solves simple story problems
Knows basic addition facts through 10
Knows basic subtraction facts through 10
Shows understanding of halves and fourths with use of objects
Uses math signs correctly in completing number sentences
Measures lengths using standard and non-standard units (i.e., cuisenaire rods)
Identifies basic geometric shapes (circle, triangle, rectangle)
Graphs simple data in science and social studies projects

SCIENCE

Physical Science
- sorts objects by properties
- groups pictures of objects

sorts objects by material
arranges objects or events in sequence
predicts and experiments

Life Science

identifies requirements for plant growth
describes events in an aquaria
identifies organisms and habitats
understands food webs
understands experiments

SOCIAL STUDIES

Identifies that all people have similar needs
Recognizes that some things are better done in groups
Identifies and relates feelings others might have in a situation
Identifies reasons for family and school rules
Understands functions of family members
Identifies simple geographic areas (farm, city)
Differentiates between simple wants and needs
Lists needs that money can buy and cannot buy
Identifies consumers and producers.
Identifies need for change in food, clothing, and shelter
Identifies the nature of familiar holidays or events
Groups ideas in a variety of ways

Performance Objectives Listed

In Second Grade Evaluation and Reporting Forms

READING

Uses short vowel sounds in word attack
Uses long vowel sounds in word attack
Reads and understands contractions
Identifies root or base words
Identifies one and two syllable words
Is developing an appropriate sight vocabulary
Uses context to identify words and meaning
Reads with fluency and expression
Comprehends material read orally
Comprehends material read silently
Identifies selection as real or make believe
Possesses a positive self-concept toward reading
Shows a willingness to perform assigned reading tasks

COMMUNICATION SKILLS

Communicates ideas clearly in writing
Speaks distinctly
Composes simple sentences with clear ideas
Uses capital letters correctly
Uses periods and questions marks correctly
Forms manuscript letters legibly and neatly with reasonable speed
Spells adequately at own level
Listens attentively when others speak
Contributes to class discussions

MATH

Uses place value correctly (ones, tens, hundreds)
Adds 3-place numbers accurately (without carrying)
Subtracts 3-place numbers accurately (without borrowing)
Knows correct use of addition or subtraction in solving story problems
Knows basic addition facts through 18
Knows basic subrtraction facts through 18
Shows understanding of 1/2, 1/3, 1/4 with use of objects
Measures lengths to the closest metric unit used (i.e., centimeter, decimeter or meter).
Differentiates between even and odd numbers
Uses math signs correctly to complete number sentences
Graphs simple data in science and social studies projects

SCIENCE

Physical science
    identifies interacting objects

keeps track of a system
identifies a system of interacting objects
describes evidence of interaction
writes experiment reports

Life Science
describes animal growth and development
recognizes stages in life cycles
infers the meaning of biotic potential
categorizes organisms

SOCIAL STUDIES

Recognizes that people adapt to their environment in similar and different ways
Identifies human interaction and resulting effect on behavior
Identifies group pressures involved in making decisions
Identifies behavior/customs influenced by family
Recognizes common geographic features: mountains, rivers, etc.
Locates the United States and Michigan on a simple map
Tells how physical features of the environment affect organisms
Identifies reasons for school, family, or community rules
Identifies influences which change one's life and family.
Compares life today with that of the past (family)
Gathers information by studying pictures and artifacts
Organizes data and draws conclusions.

APPENDIX D

LETTERS TO PARENTS

September 9, 1976

Dear

Welcome to the 1976-77 school year in Byron School! The Public Schools, Byron included, have been subjected to many changes in personnel. Dr. Robert Simpson is the new Superintendent of Schools, with Mr. Tom Summers becoming the Director of Instruction. Our staff welcomes Mr. Ed Thompson as our new teaching principal. Mr. Thompson will be responsible for part of our physical education program in conjunction with his other duties. He arrives here from Eastern School where he held a similar position. Besides Mr. Thompson, Byron has new kindergarten, first, fourth, and fifth grade teachers. Our staff has been reduced from 9 to 8 teachers this year; consequently, class sizes are larger.

In order to establish a more workable relationship, I take this opportunity to become better acquainted by sharing a little of my personal life with you. Hopefully, in doing so, to answer some of your initial questions, and begin the school year with ease and familiarity. Success in education, to me, is active communication between parent and teacher.

I attended State University, graduating in 1968 with a B.A. in Social Work. The fall of 1968, I entered City University, to obtain a Master's of Social Work. Subsequently, I became employed by Williams Community Schools, as a school Social Worker. I returned to S.U. in 1969, to fulfill requirements for a teaching certificate and a Master's of Education. My husband, Bill, and I have been married seven years. We live in a townhouse in the city. My hobbies include sewing, gardening, traveling, and biking.

For five years, the previous two with the first-second combination, I have taught in Bryon School. The first three years, I was employed by the Special Services Department as a teacher for the emotionally impaired and learning disabled. Combination grades usually bring understandable concern to parents. To alleviate some of these concerns, I will attempt to briefly explain my room organization and management. After two years with a combination, I feel very comfortable with it and, hopefully, make fewer errors. The room functions with structure and organization. The reading and math programs are individualized, with some large and small group activities incorporated. As my background dealt with perceptual problems, I use perceptual training materials with the children. Cooking projects assist in giving academic subjects a realistic base. This year, in contrast to the previous years, the children will not be separated at any time during the school day. Other than music, art, and physical education, I will teach the entire curriculum. In order to achieve the objectives of the first and second grade science and social studies, I selected the main concepts of both levels and combined them with my personal materials for varied and interesting programs. To avoid any rivalry that may, and can, develop between the two grades, I will not address the children by grade level.

At this time I would like to say welcome back to those parents who were with me last year; glad to be working with you again. To those of you who are new, I am called "Mrs. Lisa" by everyone. If you

wish to speak with me at any time, please feel free to call at school. We can arrange a time; if I am busy, leave a message and a telephone number, and I will try to call that day. I will continue to write my weekly Friday newsletter so it may well answer some questions.

For the previous two years, the primary wing has instituted a daily "fuel up" time. I would like to continue this policy, as I feel the children, as young as they are, and as lengthy as the school day is, really benefit from the additional nutrition. Each child (Mon.-Thurs.) is free to bring something, be it a sandwich, cookie, or fruit to eat immediately after the afternoon recess (2:30), for approximately ten minutes, during which time I will read a story. All I request is that you assist your child in the type and amount of the snack. This program will continue only until winter recess in December.

Fridays at 2:30 will be parent sponsored treat time. I would like to celebrate all birthdays on this day. If your child's birthday falls on other than a Friday, please sign up for the nearest Friday. I made a styrofoam birthday cake, so the children can blow out the candles. Summer birthdays may be celebrated on the child's half year birthday if you wish. At the end of this letter is a Friday volunteer slip. Please sign it, return the slip to me, and you will be contacted by the room mothers.

Here's to another successful year at Byron School. This letter is lengthy, but, hopefully, beneficial. Be seeing you soon.

"Mrs. Lisa" Hendricks

January 14, 1977

Hi--

Next week will be a busy, exciting one, filled with two extra events. On Thursday afternoon, January 20, we will vist the MSU planetarium. Mrs. Jones' room will join us. We will leave at 1:10 and return at 3:00. The show will cost 35¢ per child; please have the fee to me by Wednesday, January 19. On Friday, January 21, we will have a vegetable soup luncheon. The soup will be made with donations from parents. On the menu will be soup, crackers, celery, carrots, dessert, and lemonade. If your child desires to bring a sandwich to supplement the menu, that will be fine. As before, all the children will remain for lunch (unless they choose not to), eat, play a couple of games, and then go out for a little fresh air, or go to the art program if they are participating in it. Please fill out and return the slip below to indicate if your child will remain for the lunch.

Our "mind bender" word for last week was sympathetic, and this week's was confidence.

In math, we have continued working on telling time and began a geometry unit. We saw an excellent movie on lines, segments, rays, angels, and slopes.

In science, we invented some systems, gave them titles, and began recording our experiences--naming the interacting objects and citing evidence to prove the interaction.

For writing skills, we are continuing to emphasize correct punctuation (capitals, periods, and question marks) and the proper sentence structure. We are writing our spelling words in sentences.

Have a pleasant week end.

Mrs. Lisa 

Signature:_____

☐ Yes, _____ will attend the soup lunch.

April 1, 1977

Hi--

Be careful--it is April Fools' Day! The children have many interesting tricks in mind. Yes, April, and, hopefully, Spring, have arrived. For any of you going on vacation, a special note from an envious teacher--may it snow! No, in reality, have a safe trip and a pleasant time. If you are going to a state other than Michigan, could you bring back a daily newspaper from some town. I would like to use it for social studies.

On Thursday, April 14, Mrs. Jones' class and our will go to Wandamere on an all day field trip. We will leave at 10:30, with a sack lunch (I will furnish lemonade) in a disposable bag, and extra napkins, returning at 2:30. We will eat there and then begin our trek through the woods. Needed: 50¢ and some comfortable clothes and boots--if it has been raining, it could be muddy.

Mrs. Grinell made some very nice crayon and paint pictures with the children. Kate Vale, with the able assistance of her high school dramatics class, performed some very interesting skits with the children, grades 1-3. The children were divided into small groups and then the high school class worked with each group. The teachers became the star performers!

I am not sending home a folder this week; most things were done as a group. We concluded our units on Japan and dinosaurs. We also finished various math projects, so when we return from Spring break, we can begin all new concepts.

Have a pleasant vacation.

Mrs. Lisa

(over)

P. S. After break we will begin a "read-a-story: time. Instead of my reading a story, the children will select a book, pre-read it, and then read it to the class. The children will choose a day on a sign-up sheet. I will remind them of their day in advance. I would appreciate your assistance in helping your child select an appropriate book. This is strictly a volunteer program.

Thanks!

March 18, 1977

Hi--

Hope you had a Happy St. Patrick's Day!  Our mind bender words were selected with the "green" in mind--shamrocks, shenanigans, shillalahs, jig, toadstools, and leprechauns. We also read some Irish tales and legends of St. Patrick.

In our pencil pal exchange, we are learning to correctly address an envelope and to properly write a letter. To add to the fun, I have the children select an envelope of their choice. I am now meeting an envelope shortage. If you have any at home which you have no need of (especially colored ones), please send them in and they will be greatly appreciated and well used.

In math we are working with fractions. By using the thought of pie, cake, pizza, pancakes, etc., I am discovering the children are rapidly learning to use fractions.

Mrs. Grinell designed mobiles with the children in art this week. I thought the imaginations used by the children to create their individual mobiles was exciting! The results are unique.

In social studies, we began a study of the Japanese culture and family unit with an excellent movie about the life of a Japanese school boy.

We received a very nice letter from Paige Nelson, one of our former students, now living in Germany. She is attending a German school. She sent us some lovely pictures, her school schedule, and some German money.

Mrs. Lisa

APPENDIX E

MRS. LISA'S DIARY OF WORK DONE AT HOME

Mrs. Lisa's Diary of Work Done at Home

3/7 Monday
1. 8:00--called one parent
2. Did point slips
3. Corrected papers
4. Lesson plans--completed weekly plans for next two weeks so on Friday I can plan for after spring break

9:30--done

3/8 Tuesday
8:00--two calls to parents
Corrected papers
10:30--done

3/9 Wednesday
one-half hour on point slips and plans

3/10 Thursday
two hours 9:00-11:00
(while watching "A Circle of Children" on T.V.) corrected some math papers and did next week's planning

3/14 Monday
7:30--corrected math papers
Did point sheets
Started Friday letter
Worked on movie sheet (sheet listing movies available to teachers)
10:00--done

3/15 Tuesday
two hours
1. Called three parents
2. Worked on point slips
3. Went over movie sheet
4. Wrote new (spring) schedule in plan book

3/16 Wednesday
1. Planned movies for rest of year
2. Looked over station work
3. Got cooking things ready

(two and one-half hours)

3/17 Thursday
Point slips
Two parents called
(one hour)

3/19 Saturday
two parents called
(one hour)

3/21 Monday
Point slips
two parents called
(forty-five minutes)

3/23 Wednesday
Point slips
Called two parents
Letters
(one hour)

3/24 Thursday
Lesson plans
(one hour)

3/27 Sunday
Called three parents
Corrected papers
(one and one-half hours)

3/28 Monday
Called two parents
Corrected papers
Lesson plans
(two hours)

3/29 Tuesday
Called one parent
Corrected math papers
(one hour)

3/31 Thursday
Corrected papers
Worked on letter
(two hours)

4/2 Saturday
Wrote Paige
Sorted and ordered previous station work dittos and all writing skills dittos into correct boxes and by page numbers for next year
(two hours)

4/3 Sunday
1. Wrote Paige and Mrs. Nelson
2. Worked on lesson plans for rest of year
    a. Math
    b. Social studies and science
    c. Writing skills

d. Stations
(five hours)

4/4 Monday (Spring vacation)
At school for two hours (10:30-12:30) to clean out file cabinet, clean out humidifier, and pick up back room.

4/8 Friday
Arrived at school at 11:30 and left at 4:15. Did the following:
1. Washed down the window ledges, cabinets, and desks
2. Put up the rest of the bulletin boards
3. Went through the cupboards to sort out my own personal materials from the school ones.
4. Arranged desks
5. Changed other furniture
6. Fixed up the art lab, origami, and Qubic
7. Put buckets out and clay in them
8. Emptied window display case
9. Generally looked things over to see if I liked it and if it made sense to use
10. Did minor things (to get ready for Monday)--Mindbender, schedule, etc.

4/11 Monday
1. Did survey I received--40 minutes
2. Called four parents to set up conferences--one hour
3. Called Mrs. Melville to change her aide time--fifteen minutes
4. Went over lesson plans--one-half hour

4/12 Tuesday
(two hours)
1. Called two parents--fifteen minutes
2. Worked on graphs (for math)
3. Looked over ordering materials (for next year)

4/13 Wednesday
1. Called three parents--one-half hour
2. Corrected papers--one-half hour
3. Ordering--two hours

4/15 Friday
(three and one-half hours)
1. Did three parent conference write-ups
2. Worked on ordering

4/18 Monday
(two hours)
1. Did one parent conference form
2. Corrected Mindbender books

4/20 Wednesday
1. Corrected papers
2. Called two parents

4/24 Sunday
1. Called five parents to set up conferences--forty minutes
2. Wrote up three conferences--two hours
3. Corrected papers--fifteen minutes

4/25 Monday
1. Corrected work--one-half hour
2. Ordered movies (for next year)--three hours

4/26 Tuesday
1. Ordered movies--two and one-half hours
2. Filled out questionnaire--one-half hour

4/27 Wednesday
1. Corrected papers--one-half hour
2. Wrote up conference--one and one-half hours

4/28 Thursday
(two hours)
1. Worked on parent conference
2. Worked on IRT letter
3. Worked on movie order

5/2 Monday
(two hours)
worked on parent conferences

APPENDIX F

THE FORMS OF MRS. LISA'S PLANS: EXAMPLES FROM YEARLY, TERM, UNIT, AND WEEKLY PLANNING

F.1 Yearly Planning Examples (from Mrs. Lisa's spiral notebooks)

Reading

1. Reading lab

2. Reading
   L. A. — Silent reading each a.m. or p.m.

3. Reading
   Vowels — Reading game

4. Reading — Orange suitcases
   Phonics book

5. Options:
   Merrill books
   Reports
   Comprehension
   Creative writing

Language Arts

1st

II .

?

Days of week
Mon.
Tues.
Months
Jan.

II Capitalization
Months
Days
Streets
Names
Sentences
Cities
Towns
States
I

V. How? Where? What?
When? Who? Why?
Subject
Predicate
Describing words

Opposites
Add s-es

2nd

I. Subjects
Predicates
.
?
!

II. J.R. J.S.
L.S.
Mr.
Mrs.
February 6, 1976
E. Lansing, MI
can't
Lynda's

III. Capitals
Book Titles
Holidays
to, two, too

VII. Letters

IX. Root words

Ideas:
Word of the Week
Sounds
Verbal Directions
Code
Rhyme
Make small words

Math

Rods:
Sept.-Dec.
= Sets
>
<
grouping - tens, ones
addition
subtraction
missing addends
fractions
patterns

Timed quiz
1. Verbal
2. Written

Jan.--time
Feb.--meansurement--metric
Mar.--graphing
temp.
days
favorites
Apr.--money
menus stores & shopping
catalogs
saving accounts
checking accounts
May---review

Movies:
Sept. to Dec.:
Addition--Sept.
Subtraction--2 mid-Oct.
Tens & ones--late Oct--Sets & #'s
Fractions--Weird # & Fractions

Jan.--Lines
Feb. Metric--Length
Volume
Weight

F.2 Term Planning Examples (from spiral notebooks)

Social Studies

Week

1. Measure hands, feet, waist, lit. wt.
   Book on self
   Snoopy

2. Book on Self
   Picture of what you want to do
   Snoopy

3. U. S.--map of U. S. & begin studying states
   largest to smallest--maps of world--locate U. S. & N. A.
   Snoopy

4. Snoopy
   Duso
   U. S. Alaska
   Tex.

5. Snoopy--Holland
   U. S. Calif.
   Duso Mont.

6. Snoopy N. Mex.
   U. S. Ariz.
   Duso

7. Snoopy Nev.
   U. S. Col.
   Duso

8. Snoopy Wym.
   U. S. Ore.
   Duso

Science

Week:

1. Gliders

2. # 2 (1) 1) Object--a thing
   2) property--tells about a thing
   3) sorting--grouping

3. #11 (1) shells
   #18 (1)

4. #18 (1) #2 (2) buttons
   #21 (1) #3 (2) words
   mystery property
   mat. of the week

5. #21 (1)
   #21 (1)

6. #4 (2)
   #7 (2)

7. #7 (2)
   #7 (2)

8. #9 (2)
   #12 (2)

9. #12 (2)
   #13 (2)

10. #14 (2)
    #14 (2)

11. #15 (2)
    #15 (2)

12. #17 (2)
    #18 (2)

13. #18 (2)
    #18 (2)

14. Secret Ink

Soc.:

1. Finish ear & eye
2. Nuitrition unit--
3. Japan
4. Economics

Sci.:

1. Book--SCIS
2. ~~Planets~~--no dinosaurs!
3. Mystery powders?
4. Plants--animals
5. Mapping

Handwriting:

1. Review letters
2. Write words for writing skills
3. Books
4. Tongue Twisters

Math:

time--Jan.
Measurement--Feb.
Fractions
Graphing--Mar.
Money--Apr.

← place value
← missing addends ?

F.3 Unit Planning Examples (from spiral notebooks)

Social Studies

Nutrition

Chocolate:
Large chart--
Where from?
Made?
Used in?

Vegetables:
Grown from? dried?
Where?
ground, trees, plants

Milk: Ice cream
Cheese

Food From Plants	Food From Animals	Don't Know

Gr Game--

Food News--filler

Dairy Farm
Words Mural--make mural
Pies
Make cow puppet Visit dairy & barns

Japan

1. Clothes
2. Eat with chop sticks--rice & drink tea
3. Origami
4. Pop-up Japanese books (4) in library
5. Film strips (3)
6. Movies
7. Write Japanese
8. Plant rice
9. Use a map--see pp. 21 & 24 & 46
10. Story--of twins-- pp. 53

Mapping:

1. Draw ideal school
2. Map of room as you would have it
3. City maps--make houses, cars, lights, trees
4. Treasure hunt--
5. Grid maps in hall

Math Units

Math plans--grp. 1

1. Review carrying 199-202
   263 265 266 279
2. Borrowing 171-188 213-218
   264 267 268 280
3. Graphing--late Apr.
4. Story problems
5. Multiplication 245-256
6. Other: Money--

Both 233-237
240 269
270, 271
272-283
286

Math plans--grp. 2

1. Fractions
2. Level 8 post tests
3. < > 9, 10, 11, 12, 42, 78
4. Grouping 81
5. Money
6. Carrying
7. Graphing

Math plans--grp. 3

1. Fractions
2. > < finish--Apr.
3. Graphing--late Apr.
4. Money
5. 2 column - & + --Apr.
6. Missing addends--115, 151, 155, 193, 194, 198

F.4 Weekly Planning Examples (from plan book)

GRADE OR CLASS March 21-25, 1977 A.M.

Subject, Class or Section			
MONDAY	9:00 Roll Snews Mindbender Readiŋ Phonics Book	10:10 R	10:30 Gym 11:00 Finish up Stations
TUESDAY	9:00 Roll Snews Handwritiŋ -32 Readiŋ Lab	Assembly 10:10 R	10:30 Story 10:40 Math - Fractions Closure -223-232 Animals -273-274 Coke
WEDNESDAY	9:00 Roll Snews Handwritiŋ 34, 35, 36, 37 Readiŋ grps. Folders	10:10 R	10:30 Gym 11:00 Finish up Station
THURSDAY	9:00 Roll Snews Handwritiŋ 38, 39 Writiŋ Skills How-Open-World Copy Story from bd. Finish it & draw a pic.	Fun-bd. wk. 10:10 R	10:30 Story 10:40 Math games
FRIDAY	9:00 Roll Snews 9:10 Music	9:40 Add up pts. Word Contest 10:10 R	10:30 Gym 11:00 Spelliŋ Tests Stations

WEEK BEGINNING March 21-25, 1977 P.M.

1:00 Roll Math Quiz Math Fractions #1 - bd. #2 - 6 bd. gr. (cake)	Paddle to the Sea 28 min. 2:10 R	2:30 Spelling 2:45 Science Dinosaurs - Fin Oil 7.5. Film loops Dinosaurs - 7.5. drawing of our dinosaur	(Sinclair Oil) MONDAY
1:00 Roll Math Quiz L.A. T.V. Sets	2:10 R	2:30 Spelling 2:45 Sci. or Soc. St. Dinosaurs pictures & write a story about you as a dino- saur & what it would be like	TUESDAY
1:00 Roll Spelling Math #3 - missing addends #2 - L8 part tests #1 - carrying	#1 2:10 R	2:30 Library 3:15 Math Quiz	WEDNESDAY
1:00 Roll Math quiz Weekly readers Dancing	2:10 R	2:30 Peasant Papers clean up - pts spelling bee (Sts Council)	THURSDAY
1:00 Roll U.S.S.R. Soc. St. - Japan #1 - film strip #2 village life - plant rice (maps)	2:10R	2:50 treat clean up 3:00 Bike rules Stealing	FRIDAY

GRADE OR CLASS January 17-21, 1977 A.M.

Subject, Class or Section			
MONDAY	9:00 roll Snews Handwriting - mind-bender Reading gra. (temptation) Phonics bk. Bd. Wk.	10:10 R	10:30 Gym 1:10 Finish up
TUESDAY	9:00 roll Snews Handwriting bk. Reading lab	10:10 R	10:30 Story 10:40 Math ~~place value~~ Time
WEDNESDAY	9:00 Roll Snews Handwriting Book Reading gra. Folders	10:10 R	10:30 Gym 11:00 Finish up Stations
THURSDAY	9:00 Roll Snews Handwriting Reading gra. Writing skills Write recipes	cook 10:10 R	10:30 Story 10:40 Math cook
FRIDAY	9:00 Roll Snews 9:10 music	9:40 Snoopy Books 10:10 R	10:30 Gym 11:00 Spelling test Stations Luncheon

WEEK BEGINNING January 17-21, 1977 P.M.

1:00 Roll Spelling - words - seat. 1:20 Soc. St. - Movies Dog River Family	2:10 R	2:30 Math Quiz 2:45 Math gr. ~~place value~~ time Sell Stamps	MONDAY
1:00 Roll Art	2:10 R	2:30 Math Quiz 2:45 Letter (movie) .400 Asher	TUESDAY
1:00 Roll Spelling - De-coding a Bee 1:20 Science Make Place Mats - Weaving	2:10 R	2:30 Math Quiz 2:40 Library	WEDNESDAY
Planitarium 1:15 field trip	2:10 R	pass out papers Sell stamps 4:00 Hendricks	THURSDAY
1:00 Roll U.S.S.R. 1:30 Weekly Reader Snowflakes Add up pts.	2:10 R	2:30 treat Job - clean up 3:30 Movies Paul Bunyan Burgess	FRIDAY

APPENDIX G

SPRING TERM SCHEDULE

PLANNING PROTOCOL

SPRING TERM SCHEDULE PLANNING PROTOCOL

3/11/77

STEPS:

1. Gets out 1 sheet of paper for a.m. and 1 for p.m. and puts days of weeks across the top (sheets turned sideways).

   Q - "So this will be a typical weekly format?"

   A - "Yes, right now I'm just putting it in to play around with it. I have no idea what it will look like...except that I know that I'd like to try reading for a little bit in the afternoon and...these are the things I want to put in it."

   story hour
   remedial handwriting group
   tongue twisters and Bill Martin Books
   mapping
   Snoopy Books
   revising reading for high kids

2. Finds list of things that she made up when she was doing winter schedule to make sure she had all the things in the schedule.

3. She also gets out list of aide times.

4. Checks through activities:
   mindbender - will continue
   handwriting books - will continue
   math quizzes - maybe a little extra so 2nd graders can get down math facts
   silent reading - USSR plus one other activity (may incorporate into reading groups)
   group math - money and graphing stations
   vowel sounds, quizzes, orange suitcase
   post office - out
   make works - out (will be done as a contest)
   spelling - will try to change routine of M-writing wores; T-decoding;

Th-spelling bee. Will leave in spelling bee since kids really like it.
decoding - may do it differently
snoopy books - wants to get back to them
rhyming - ?
Weekly readers - still has them coming

5. Writes in activities she has to work around

MTWTH	10:10 -	10:30 -	recess
MWF	10:30		gym
F	9:10 -	9:40 -	music
MTWTH	2:10 -	2:30 -	recess
W	2:30		library
T	9:20		reading lab
T	2:00		every other week - art

6. Looks at math and reading ("the biggest things")

7. Puts down USSR silent reading on Friday after lunch.

8. Looks at current schedule for reading times M, T, W, Th. a.m. - reading. Says, "Monday is a good day almost all day since they aren't so extremely exhausted. Tuesdays they aren't too bad. By Wednesday, they start pooping out in the afternoon. That's something you have to remember and having any neatly planned, hard academic activities on Friday is really dumb, so that probably won't change a lot."

9. Says she could have reading Monday afternoon first thing. Then says, "The other thing I have to keep in mind when I start figuring that, is planning time for me. Does it mean that I'm going to have to spend my entire lunch hour preparing for that? Also, correcting. Am I going to spend a lot of time at night then correcting this sort of stuff that I usually correct at noon?"

10. Initially tries reading Monday afternoon, Tuesday morning (reading lab), Wednesday afternoon and Thursday morning.

11. Next checks her aide schedule to see how that fits in:

Monday a.m. - Sandy, Mrs. P.
Weds. a.m. - Sandy, (Plus student aide all day)
Thurs. a.m. - Sandy, Mrs. S.

12. Tries to decide whether she could handle it all on her own Monday p.m. and Wednesday p.m. Remembers she's supposed to have a student aide all day Wednesday.

13. Puts down reading as such:

    Monday - p.m.
    Tuesday - a.m.
    Wed. - p.m.
    Thurs. - a.m.

14. Next decides what reading to do on each day. Thursday, because of all the help (aide and parent volunteer) it would be to her advantage to do book reports - puts it down on schedule. Wednesdays - phonics books (tentatively); Mondays - wonders if parent volunteer could come Monday p.m. rather than Monday a.m. - puts it down anyway.

15. Looks for second spot for silent reading - ponders Monday as a time but decides to go on.

16. Looks to fit in math; looks at Monday a.m. Then looks at 30 minute slot after gym on Monday, Weds., and Fridays. Puts down math for Monday, Tues., Weds., Thurs. for morning.

17. Then looks at 30 minute slots after gym (11:00 - 11:30) on Monday, Wednesday and Fridays so that she can have spelling the same time every day but notices that she has four blocks on Tuesday and Thursday. "You don't want to use a half hour for one thing and a half hour for another necessarily. It usually doesn't work out that well."

    Q - "Why do you want to have spelling the same time every day?"

    A - "So it is consistent. The more consistent it is, the better I feel the kids know what is coming off and the better they learn."

18. Says the one time she does have open, except for Friday, the period first thing in the morning. That would be okay since she says she's going to keep the spelling test where it is on Friday (11:00 - after gym) because for one thing her aide is here to help give the tests.

19. Says all year she has had handwriting first thing every morning since it is so important (especially Sept. to Dec., where they often spent 45 minutes every morning on handwriting). "Without the handwriting they can't do anything else." But she feels this is less important now and decides to write in spelling each morning.

20. She starts writing it in and says "there's only one problem - we have a spelling bee." She says that would be on Thursday morning and she has down book reports for that morning. "We can't get the book reports done and have a spelling bee. There isn't enough time."

21. Looks at having it the first thing in the afternoon but says that they have art every other week and throws Tuesday off, and library on Wednesdays. Keeps her from having it right after recess in the afternoon.

22. Decides to put spelling bee down for first thing in morning anyway and see what she comes up with.

23. She notices hour after recess on Thursday and changes book reports to there, since she'll have Sandy then also.

24. She next looks at half hour blocks on M, W, and Friday and puts down handwriting for that period.

25. Remembers one other thing that she is "tied into" - on Thursday afternoon she has to pass out papers. "Because I'm not about to do it (separate the week's work to go home) myself" (brackets are mine).

26. She checks her list to see what she still has:

    vowel sounds and quizzes
    rhyming
    weekly reader

    says, "all reading type things"

    She looks at placing these after spelling bee on Thursday, then says "Um boy, being locked into aides (times) really hurts too. That's what got me all messed up last time."

27. She next looks for a time to have the kinds read to the class - after recess. The best time for her is the afternoon. Sees they could do it Monday, Tuesday, and Friday or M, T, Th, and Fri.

28. She looks to see how many weeks they have left and counts 9. 9 times 4 is 36 but she then counts the number of interfering activities such as p.d. days and counts up 32 possible days. She says that would be enough time for everyone to read once and for some to have a second chance so she decides to do it 4 times a week (M, T, Th, F) right after recess.

29. She then puts down writing skills for Tuesday afternoon when they don't have art. This includes the Bill Martin Books, Pencil pals and newspaper. She says "That's an awful lot for every other week for what's left. Out of nine weeks that means we only get 4 times, so I need another time besides that. I'll have to have it twice."

30. She says Friday afternoon could be the other time and looks to see how many Fridays they'll miss before end of school. She sees they only miss two so after silent reading on Friday may be a good time.

31. She checks list again and puts mindbender word down for Monday during handwriting.

32. She says she still has some big blocks of time because she doesn't have much math in yet.

33. She next says that she is uneasy about "wasting" Monday morning on Math when they are so ready to settle down and reading with so much more sense at that (time in the) morning."

34. She starts to put reading on Monday morning but says she still has spelling there. Says spelling, depending on what she does for an activity is 15 minutes long. That would make it 9:20 and until 10:10 that would not make it (reading) very long. She says though that's about all the time she has now, she has after recess to finish up.

35. She says, "Oh boy, this trying to squeeze in spelling is really a problem." She then considers the possibility of having spelling not all at the same time:

    Monday - p.m. first thing
    Tuesday - a.m. first thing
    Weds. - a.m. first thing
    Thurs. - spelling bee in afternoon again. She then says "I should probably figure out what kind of activities I want to do for spelling before I figure out when I want it."

36. She says "The spelling bee takes the longest." Then says, "I still think Monday morning is going to have to be reading time...Anyway I look at it, it's the only thing that makes sense since then I have Sandy and Mrs. Pat for aides." So she moves reading with book reports to Monday morning starting at 9:05.

37. She then looks at Monday morning schedule which would have reading, recess, gym, then handwriting. She says "handwriting would be a good activity (after gym) since it is kind of quiet and settling." She says from 9:05 to recess would give her an hour and 5 minutes until recess and she thinks she could get all of the reading and book reports done in that period.

38. She then goes to Monday afternoon. She says she could have spelling first thing, then she has two blocks of time left. She considers putting math in after spelling, but says, "My problem is that I always think of spelling as being a writing skills or reading type thing...and I wonder how much (of a) transition problem it would be to go from spelling into math. One thing, I can anticipate the fact that they're not all going to be done (with their spelling) at the same time. So, it will mean some of then having to wait after they finish their spelling to start their math, if I wanted to do anything

as a large group or even in small groups."

39. She then looks at last period in afternoon. She says on Wednesdays she has 15 minutes after library and looks at putting spelling at 3:10 every day and come back from library on Wednesdays 5 minutes early. She then says, "That has possibilities. It depends what I want to put in here (pointing to open periods on Monday and Tuesday afternoons after recess). Maybe I finally found a place for it."

40. She says that would leave her those two open times for social studies and science...or for something else.

41. She then goes through complete Monday schedule: reading (book reports), gym, handwriting (mindbender), math, story, blank, spelling. She then puts down a math quiz and math facts before math and then says "Is there anything else besides science and social studies that I'd rather fit in Monday because Monday is usually such a good day for them?"

42. She considers weekly reader then looks to see how much time she really has there. She says the story reading will probably go until 2:45 since they are such slow readers, and it would be 2:50 before they could start on an activity. "Twenty minutes would be all I have here, so that's too short for any big lesson." So she decides to put weekly reader in there, saying, "Let's see if that makes sense as we go along."

43. She then looks at Tuesday morning and says she has a time open before reading lab since she refuses to go up there for that long of a time. Then reading lab, blank, art or writing skills, story, blank, spelling.

44. She then looks for something to do before reading lab. Considers decoding, rhyming, vowel sounds. She then glances over Wednesday's schedule, then finally puts in handwriting books for that period.

45. Lisa then says that she feels she can cut math back to 3 times a week since there is not a whole lot that the kids need to learn that they don't already know. Since they "hit it so hard" this winter (4 times/week). She says, "We can cover everything we need to 3 periods and still have time left over" and says "when I'm thinking about math, I'm not putting it as a top priority anymore; I'm putting more emphasis on where they lack in reading and writing skills now." She says they need work on creative writing, vowels and sounding out words rather than just reading in workbooks. "So I'm feeling the need to have reading a little bit more often and math a little less."

46. She says silent reading after story on Tuesday would help fulfill this need. She says it's a completely different type

of reading activity from reading lab in the morning (where they listen to tapes) and says "I don't want to have two of the same type of activity in the same day."

47. She decides to leave period open for Tuesday morning after recess.

48. She then looks at Wednesday's schedule. She says she has Sandy and an aide in the morning and could easily have reading in the afternoon and have math in the morning and a short activity after gym.

49. She writes in math quiz then math (Sandy would be here for a math group); then gym and leaves period after gym blank.

50. She then goes to Thursday schedule. She has reading after recess and Sandy could read with a group and she could show the orange suitcase before she arrives.

51. She says that before recess may be a good time for math and that would put two math periods back to back on Wednesday and Thursdays. She says that that makes sense to her since it would give her the carry over from Wednesday to Thursday that she doesn't have if the periods are far apart.

52. She says that leaves a big block of time on Thursday afternoon "which I need to get for science or social studies. I haven't gotten any in here yet." She then sets aside time for doing either science or social studies.

53. She then reviews Thursday schedule as math quiz, math, recess, orange suitcase and reading. She says the one group she is concerned about is the bottom reading group and this gives her Monday morning, Wednesday afternoon and Thursday morning to read with them. "I want to be able to read with them at least three times a week. Because without that kind of constant reading with them, they are going to forget a lot. They don't know it well enough to go off on their own. The 5 boys in 'Surprises' book still need to be read with at least twice a week but I would like to give them the opportunity to read once a week on their own because I know they're feeling that everyone else is better than they are since everyone else gets to read on their own and they aren't."

54. She reviews Thursday afternoon as it is set: Science or social studies, recess, story, pass out papers and spelling bee.

55. She then moves to Friday's schedule. She puts down music, add up points, blank (since they won't be doing word contest in class), recess, gym, spelling tests; p.m. - silent reading, writing skills, recess, treat, clean up and movies. "I really feel that movie time is good for the kinds and it gives me time

also to put my head back together Friday afternoon." She says it also gives them a time to be with the class next door (since they see them together).

56. She then goes back to see where the gaps are:

Monday is full
Tuesday - after morning recess
Weds. - after gym
Thurs. - full
Fri. - 15 minutes not full (in a.m. after adding up points)

57. She says she has 3 gaps and then looks to see what she has left on her list.

58. She sees Snoopy books and says "perfect" and puts in the 15 minute slot on Friday morning.

59. She says she has left:

remedial handwriting group
rhyming (if she wants)
decoding

She says she could stick with using decoding in spelling.

60. She says, "Here (Weds. morning) is half an hour and here (Tuesday morning) is more like an hour." She looks at them for a minute and then says "Priorities. I only have science and social studies once. Shame on me. (you) see how much priority I give that."

61. She thinks about putting handwriting group in the slot after gym on Wednesdays since she could take that group and the student aide could take the rest of the group and do something with them. She also notices she has no station work in yet and other kids could do station work or rhyming. She says "It has to be something the other kids won't miss out on doing. It can't be something particularly enthusiastically fun cause then they won't want to work with me. Because they won't want to work with me anyway since we really work."

62. Decides to put down station work and keep in mind that she has an aide since she might be able to do something completely different in their stations.

63. She then says that this could be a good time for the kids to practice their math facts - do flash cards. "No matter how bad the aide would be she could handle that."

64. Lisa then checks through her class list to see how many kids she'll have in the handwriting group - she counts 9 or possibly 10. That would leave the aide with 16 or 17 kids.

65. Lisa then says the block of time on Tuesday morning could be filled in with science or social studies.

66. She then says "that will do it. It will get in everything in that I had planned and be stressing the things I feel need stressing." She then checks her aide times and says she'll only have to change one of her parent volunteers from Tuesday morning before reading lab.

67. She then checks over reading periods again and switches orange suitcase to Wednesdays and puts folders on Thursday.

68. She then says "That looks pretty good to me. You have to try it out for 3 weeks to find out...since it takes a while for the kids to adjust to a new schedule."

TOTAL TIME INVOLVED - 75 MINUTES

LIST OF REFERENCES

LIST OF REFERENCES

Alexander, C. Notes on the synthesis of form. Cambridge: Harvard University Press, 1964.

Amidon, E.J. and Hunter, E. Verbal interaction in the classroom: The verbal interaction category system. In Amidon, E.J. and Hough, J.B. (eds), Interaction analysis: theory, research and application. Reading, Mass.: Addison-Wesley, 1967.

Anderson, R.L. and Faust, G.W. Educational psychology. New York: Dodd, Mead, and Company, 1974.

Anderson, V.W. Principles and procedures for curriculum improvement. New York: The Ronald Press Company, 1956.

Archer, L.B. An overview of the structure of the design process. In Moore, G. (ed), Emerging methods in environmental design and planning. Cambridge: MIT Press, 1970.

Argenti, J. Systematic corporate planning. New York: John Wiley & Sons, 1974.

Baer, A.E. A cognitive model of problem formation in design. Carnegie-Mellon University, Institute of Physical Planning, Research Report No. 62, 1976.

Bahle, J. Zur psychologie des musikalischen gestaltens, eine untersuchung über das komponieven auf experimenteller und historischer grundlage. Archiv für die gestamte Psychologie, 1930, 74, 289-390.

Bahle, J. Der musikalische schaffungsprozess. Psychologie der schöpferischen erlebniss und antriebformen. Leipzig: Hirzel, 1936.

Bahle, J. Eingebung und tat im musikalischen schaffen. Ein beitrag zur psychologie dur entwicklungs-und schaffensgesetze schöpferischer menschen. Leipzig: Hirzel, 1939.

Barker, R.G. On the nature of the environment. Journal of Social Issues, 1963, 19, 17-38.

Barnard, C.I. The functions of the executive. Cambridge, Mass.: Harvard University Press, 1938.

Beauchamp, G.A. Basic dimensions of elementary methods. Boston: Allyn and Bacon, 1965.

Becker, H.S. Problems of inference and proof in participant observation. American Sociological Review, 1958, 28, 652-660.

Berliner, D.C., Cahen, L., Filby, N., Fisher, C., Marlave, R., Moore, J. Proposal for Phase III-B of the BTES. San Francisco: Far West Laboratory for Educational Research and Development, 1976.

Birch, H.G. and Rabinowitz, H.S. The negative effect of previous experience on productive thinking. Journal of Experimental Psychology, 1951, 41, 121-125.

Blackham, H.J. Political discipline in a free society. London: Allen and Unwin, 1961.

Bloom, B.S. The thought processes of students in discussion. In French, S.J. (ed), Accent on teaching: Experiments in general education. New York: Harper, 1954.

Bobrow, D.G. Dimensions of representation. In Bobrow, D.G. and Collins, A. (eds), Representation and understanding. New York: Academic Press, Inc., 1975.

Bollens, J.C. and Schmandt, H.G. The metropolis: Its people, politics, and economic life. New York: Harper, 1965.

Broadbent, G.H. Creativity. In Gregory, S.A. (ed), The design method. London: Butterworths, and New York: Plenum Press, 1966.

Brophy, J. and Evertson, C. The teacher effectiveness project. In T. Good (ed), Trends in the study of the classroom. New York: APS Publications, 1974. (a)

Brophy, J. and Evertson, C. The Texas teacher effectiveness project: Summary report. Research report, the Research and Development Center for Teacher Education. The University of Texas at Austin, 1974. (b)

Brophy, J. and Evertson, C. The Texas teacher effectiveness project: Presentation of non-linear relationships and summary discussion. Research report, the Research and Development Center for Teacher Education. The University of Texas at Austin, 1974. (c)

Caswell, H.L. and Cambell, D.S. Curriculum development. New York: American Book Company, 1935.

Chase, W.G. and Simon, H.A. The mind's eye in chess. In Chase, W.G. (ed), Visual information processing. New York: John Wiley and Sons, 1973.

Clark, C.M. and Peterson, P.L. Teacher stimulated recall of interactive decisions. Paper presented at the Annual Meeting of the American Educational Research Association. San Francisco, 1976.

Clarkson, G.P.E. Portfolio selection: A simulation of trust investment. Englewood Cliffs, New Jersey: Prentice Hall, 1962.

Collier, C.C., Houston, W.R., Schmatz, R.R. and Walsh, W.J. Teaching in the modern elementary school. New York: The MacMillan Co., 1967.

Collins, Peter. Architectural judgment. Montreal: McGill-Queen's University Press, 1971.

Craik, F.I.M. Primary memory. British Medical Bulletin, 1971, 27, 232-236.

Cusick, P.A. Inside high school. New York: Holt, Rinehart, and Winston, 1973.

Dahl, R.A. The policies of planning. International Social Science Journal, 1959, 3, 340.

Davidoff, P. and Reiner, T.A. A choice theory of planning. Journal of the American Institute of Planners, 1962, 28, 103-115.

Davis, R.H., Alexander, L.T., and Yelon, S.L. Learning system design. New York: McGraw Hill, 1974.

Dawes, R.M. The mind, the model, and the task. Paper presented at the 7th Annual Indiana Theoretical and Cognitive Psychological Conference. Bloomington, Indiana, April, 1974.

de Groot, A.D. Thought and choice in chess. The Hague: Mouton, 1965.

Dewey, J. Human nature and conduct. New York: H. Holt, & Co., 1922.

Doyle, W. Learning the classroom environment: An ecological analysis of induction into teaching. Paper presented at the Annual Meeting of the American Educational Research Association. New York, April, 1977. (a)

Doyle, W. The uses of nonverbal behaviors: Toward an ecological model of classrooms. Merrill-Palmer Quaterly, July, 1977. (b)

Dror, Y. The planning process: A facet design. International Review of Administrative Sciences, 1963, 29, 46-58.

Dunker, K. On problem solving. Psychological Monographs, 1945, 58, whole no. 270.

Dunkin, M.J. and Biddle, B.J. The study of teaching. New York: Holt, Rinehart, and Winston, 1974.

Dyckman, J.W. Planinng and decisions theory. Journal of the American Institute of Planners, 1961, 27, 335-345.

Eastman, C.M. Explorations in the cognitive process of design. Carnegie-Mellon University, Department of Computer Science ARPA Report, DDC No. 671-158, 1968.

Eastman, C.M. Cognitive processes and ill-defined problems: A case study from design. Proceedings of the Joint International Conference on Artificial Intelligence. Washington, D.C., 1969.

Eastman, C.M. On the analysis of intuitive design processes. In Moore, G. (ed), Emerging methods in environmental design and planning. Cambridge: MIT Press, 1970. (a)

Eastman, C.M. Problem solving strategies in design. Carnegie-Mellon University, School of Urban and Public Affairs, Reprint No. 23, 1970. (b)

Eastman, C.M. General space planner: A system of computer aided architectural design, user documentation. In Mitchell, W.J. (ed), Proceedings of the EDRA3/AR8 conference. Berkeley, 1972.

Eastman, C.M. Automated space planning. Artificial Intelligence, 1973, 4, 41-64.

Eisner, E.W. Educational objectives: Help or hinderance. School Review, 1967, 75, 250-266.

Elstein, A., Shulman, L.S., Sprafka, S.A., Jason, H., Kagan, H., Allal, L., Gordon, M., Loupe, M.J., and Jordon, R.D. Medical problem solving: An analysis of clinical reasoning. Cambridge: Harvard University Press, in press.

Etzioni, A. Mixed scanning: A "third" approach to decision-making. Public Administrative Review, 1967, 27, 385-392.

Etzioni, A. The active society: A theory of societal and political processes. New York: The Free Press, 1968.

Faber, M. and Sears, D. (eds). The crisis in planning. Vol. 1: The issues; Vol. 2 : The experience. London: Chattos and Windus for the Sussex University Press, 1972.

Fishburn, C.E. Learning the role of the teacher. Journal of Teacher Education, 1966, 17, 329-331.

Friedmann, J. A conceptual model for the analysis of planning behavior. Administrative Science Quarterly, 1967, 2, 225-252.

Friedman, J. and Hudson, B. Knowledge and action: A guide to planning theory. Journal of the American Institute of Planners, 1974, 40, 2-16.

Gagné, R.M. The analysis of instructional objectives for the design of instruction. In Glaser, R. (ed), Teaching machines and programmed learning. Vol 2. Data and directions. Washington, D.C.: National Education Association, 1965.

Gagné, R.M. The conditions of learning, (2nd ed). New York: Holt, Rinehart, and Winston, 1970.

Gagne, R.M. Essentials of learning for instruction. Hinsdale, Ill.: The Dryden Press, 1974.

Gaudet, J. Eléments et théorie de l'architecture, Vol. 1., Librarairie de la Construction Moderne, 1904.

Getzels, J.W. and Csickszentmihalyi, M. The creative vision: A longitudinal study of problem finding in art. New York: John Wiley and Sons, 1976.

Glaser, B. and Strauss, A. The discovery of substantive theory: A basic strategy underlying qualitative research. The American Behavioral Scientist, 1965, 8, 5-12.

Glaser, B. and Strauss, A. The discovery of grounded theory: strategies for qualitative research. Chicago: Aldine, 1967.

Glaser, R. Implications of training research for education. In Hilgard, E.R. (ed), Theories of learning and instruction. The 63rd Yearbook of the National Society for the Study of Education. Chicago: University of Chicago Press, 1964.

Gordon, W.J.J. Synectics: The development of creative capacity. New York: Harper and Row, 1961.

Gross, B.M. National planning: Findings and falicies. Public Administration Review, 1965, 25, 263-273.

Gump, P.V. The classroom behavior setting: Its nature and relation to student behaviof. Final Report, Contract No. OE-4-10-107, U.S. Bureau of Research, H.E.W., 1967.

Gump, P.V. Intra-setting analysis: The third grade classroom as a special but instructive case. In Willems, E.P. and Raush, H.L. (eds), Naturalistic viewpoints in psychological research. New York: Holt, Rinehart, and Winston, 1969.

Gwynn, J.M. Curriculum principles and social trends. New York: MacMillan Company, 1943.

Harnischfeger, A. and Wiley, D. Conceptual policy issues in elementary school teaching-learning processes. Research proposal submitted to N.I.E. Basic Skills Group, 1976.

Henrion, M. Notes on the synthesis of problems: An exploration of problem formulations used by human designers and automated systems. Unpublished Masters Thesis, Royal College of Arts. London, 1974.

Hilsom, S. and Cane, B.S. The teacher's day. London: National Foundation for Educational Research in England and Wales, 1971.

Hirschman, A.O. Developmental projects observed. Washington, D.C.: The Brookings Institute, 1967.

Homans, G.C. The human group. New York: Harcourt, Brace and World, Inc., 1950.

Hudgins. B.B. The instructional process. Chicago: Rand McNally and Company, 1971.

Hymes, D. Foundations in sociolinguistics. Philadelphia: University of Pennsylvania Press, 1974.

Institute for Research on Teaching. Proceedings of the research on teaching mathematics conference. Conference Series No. 3. East Lansing: Institute for Research on Teaching, Michigan State University, in press.

Jackson, P.W. The way teaching is. Washington: National Education Association, 1965.

Jackson, P.W. Life in classrooms. New York: Holt, Rinehart, and Winston, 1968.

Jacobson, M.D., Stimart, R.P., and Wren, G.T. Models and educational research. American Educational Research Journal, 1971, 8, 311-320.

Jones, J. The state of the art in design methods. In Moore, G. (ed), Emerging methods in enviornmental design and planning. Cambridge: MIT Press, 1970.

Joyce, B., Morine, G., Weil, M., and Wald, R. (eds), Materials for modules: A classification of competency oriented tools for teacher education. New York: Teachers College, Columbia University, 1971.

Kagan, N., Krathwohl, D.R., Goldberg, A.D., and Cambell, R. Studies in human interaction; Interpersonal process recall stimulated by videotape. East Lansing: Michigan State University, 1967.

Kounin, J.S. Discipline and group management in the classroom. New York: Holt, Rinehart, and Winston, 1970.

Krauss, R. and Myer, J. Design: A case history. Center for Building Research, MIT, 1968.

Krug, E.A. Curriculum planning. New York: Harper and Brothers, 1950.

Lanier, J.E. and Shulman, L.S. Technical proposal, Institute for Research on Teaching. Michigan State University, 1975.

Lewin, K. Intention, will, and need. In Rapaport, D. (ed), Organization and pathology of thought. New York: Columbia University Press, 1951.

Lindblom, C.E. The science of "muddling through". Public Administrative Review, 1959, 19, 79-88.

Lindblom, C. The intelligence of democracy. New York: Free Press, 1965.

Lindsay, P.H., and Norman, D.A. Human information processing: An introduction to psychology. New York: Academic Press, 1972.

Lundgren, U.P. Frame factors and the teaching process: A contribution to curriculum theory and theory on teaching. Stockholm: Almgrist and Wiksell, 1972.

MacDonald, J.B. Myths about instruction. Educational Leadership, 1965, 22, 571-576, 609-617.

MacDonald, J.B., Wolfson, B.J., and Zaret, E. Reschooling society: A conceptual model. Washington, D.C.: Association for Supervision and Curriculum Development, 1973.

Mager, R.F. Preparing objectives for programmed instruction. San Francisco: Fearon, 1962.

Maier, N.R.F. Reasoning in humans. 1. On direction. Journal of Comparative Psychology, 1930, 11, 115-143.

Maier, N.R.F. Reasoning in humans. 2. The solution of a problem and its appearance in consciousness. Journal of Comparative Psychology, 1931, 12, 181-194.

Maier, N.R.F. Reasoning in humans. 3. The mechanisms of equivalent stimuli and of reasoning. Journal of Experimental Psychology, 1945, 35, 349-360.

Mandler, J.M. and Mandler, G. Thinking: from association to gestalt. New York: John Wiley and Sons, 1964.

Newell, A. You can't play 20 questions with nature and win: Projective comments on the papers of this symposium. In Chase, W.G. (ed), Visual information processing. New York: John Wiley and Sons, 1973.

Newell, A. and Simon, H.A. Human problem solving. Englewood Cliffs, N.J.: Prentice-Hall, 1972.

Nisbett, R.E. and Wilson, T.D. Telling more than we can know: Verbal reports on mental processes. Psychological Review, 1977, 84, 231-259.

Osborn, A.F. Applied imagination: Principles and procedures of creative problem solving. New York: Scribners, 1957.

Peterson, D.G. The elementary school teacher. New York: Appleton-Century-Crofts, 1964.

Peterson, P.L., Marx, R.W. and Clark, C.M. Teacher planning, teacher behavior, and student achievement. Unpublished manuscript, 1977.

Peterson, W. On some meanings of "planning". Journal of the American Institute of Planners, 1965, 31, 130-142.

Philips, S.U. Participant structures and communicative competence: Warm springs children in community and classroom. In Cazden, C., Hymes, D., and John, V.C. (eds), Functions of language in the classroom. New York: Teachers College Press, 1972.

Popham, W.J. and Baker, E.L. Systematic instruction. Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1970.

Popham, W.J., Eisner, E.W., Sullivan, H.J., and Tyler, L.L. Instructional objectives. American Educational Research Association Monograph Series on Curriculum Evaluation, No. 3, Chicago: Rand McNally, 1969.

Reitman, W.R. Heuristic decisions procedures, open constraints, and the structure of ill-defined problems. In Shelly, M.W. and Bryan, G.L. (eds), Human judgment and optimality. New York: John Wiley and Sons, 1964.

Royal Institute of British Architects, Handbook of architectural practice and management., 1967.

Rusch, C.W. The role of graphic activity in the design process. In Moore, G. (ed), Emerging methods in environmental design and planning. Cambridge: MIT Press, 1970.

Sayior, J.G. and Alexander, W.M. Planning curriculum for schools. New York: Holt, Rinehart, and Winston, 1974.

Manheim, M.L. A design process model: Theory and applications to transportation planning. In Moore, G. (ed), Emerging methods in environmental design and planning. Cambridge: MIT Press, 1970.

March, J. and Simon, H.A. Organizations. New York: John Wiley and Sons, 1959.

Matchett, E. Control of thought in creative work. Chartered Mechanical Engineer, 1968, 15, 163-166.

Meyerson, M. and Bonfield, E.L. Politics, planning and the public interest. Glencoe, Ill.: The Free Press, 1955.

Miller, G.A. The magical number seven plus or minus two: Some limits on our capacity for processing information. Psychological Review, 1956, 63, 81-97.

Miller, G.A., Galanter, E. and Pribram, K.H. Plans and structure of behavior. New York: Holt, Rinehart, and Winston, 1960.

Mohr, M. A computer model of the design process that uses a concept of an apartment floorplan to solve layout problems. In Mitchell, W.J. (ed), Proceedings of ERDA3/AR8 conference, UCLA, Los Angeles, 1972.

Moran, T. A model of a multilingual designer. In Moore, G. (ed), Emerging methods in environmental design and planning. MIT Press, 1970.

Morine, G. Planning skills: Paradoxes and parodies. Journal of Teacher Education, 1973, 19, 135-143.

Morine, G. Special study L: A study of teacher planning (BTES Technical Report 76-3-1). San Francisco: Far West Laboratory for Educational Research and Development, 1976.

Morine, G. and Joyce, B. Variables that effect teacher's decision making: A proposal. Proposal submitted to Institute for Research on Teaching. Michigan State University, 1976.

Morine, G. and Morine, H. Teaching. In Goodlad J.I. and Shane, H.G. (eds), The elementary school in the United States. The Seventy-second Yearbook of the National Society for the Study of Education, Part 2. Chicago: University of Chicago Press, 1973.

Myrdal, G. Beyond the welfare state: Economic planning and its international implications. New Haven: Yale University Press, 1970.

Nadler, G. Engineering research and design in socioeconomic systems. In Moore, G. (ed), Emerging methods in environmental design and planning. Cambridge: MIT Press, 1970.

Seely, J.R. What is planning? Definition and strategy. Journal of the American Institute of Planners, 1962, 28, 91-97.

Selz, O. Ueber die gesetz des geordneten denkverlaufs. Stuttgart: Spemann, 1913.

Selz, O. Zur psychologie des produktiven denkens und des irrtums. Bonn: Friedrich Cohen, 1922.

Selz, O. Die gesetze de produktiven und reproduktiven geistestätigkeit. Kurzgefasste darstellung. Bonn: Fredrich Cohen, 1924.

Shavelson, R.J. What is the basic teaching skill? Journal of Teacher Education, 1973, 24, 144-151

Shulman, L.S. Seeking styles and individual differences in patterns of inquiry. School Review, 1965, 73, 258-266.

Shulman, L.S. and Elstein, A.S. Studies of problem solving, judgment, and decision making. In Kerlinger, F.N. (ed), Review of Research in Education. Vol. 3. Itaska, Illinois: F.E. Peacock and Co., 1975.

Shulman, L.S., Loupe, M.J. and Piper, R.M. Studies of the inquiry process: Inquiry patterns of students in teacher training programs. East Lansing: Final Report, Project No. 5-0597, Office of Education. Michigan State University, 1968.

Shultz, J. It's not whether you win or loose or how you play the game: A microethnographic analysis of game playing in a kindergarten/first grade classroom. Working paper, Newton Classroom Interaction Project, Harvard Graduate School of Education, 1976.

Simon, H.A. Administrative behavior: A study of decision-making processes in administrative organizations (2nd ed.) New York: The MacMillan Co., 1957. (a)

Simon, H.A. Models of man. New York: John Wiley and Sons, Inc., 1957. (b)

Simon, H.A. The sciences of the artificial. Cambridge, Mass.: MIT Press, 1969.

Simon, H.A. The structure of ill structured problems. Artificial Intelligence, 1973, 4, 181-201.

Simon, H.A., Smithburg, D.W., and Thompson, V.A. Public Administration. New York: Knopf, 1950.

Snow, R.E. Theory construction for research on teaching. In Travers, R.M.W. (ed), Second handbook of research on teaching. Chicago: Rand McNally, 1973.

Smith, L.M. and Geoffrey, W. The complexities of an urban classroom. New York: Holt, Rinehart, and Winston, 1968.

Taba, H. Curriculum development, theory and practice. New York: Harcourt, Brace and World, Inc., 1962.

Taba, H. Teaching strategies and cognitive in elementary school children. San Francisco: San Francisco State College, 1966.

Tinbergen, J. On the theory of economic policy. Amsterdam: North Holland, 1952.

Tinbergen, J. Economic policy: Principles and design. Amsterdam: North Holland, 1964.

Tyler, R.W. Basic principles of curriculum and instruction. Chicago: University of Chicago Press, 1950.

Varduin, J.R. Cooperative curriculum development. Englewood Cliffs, N.J.: Prentice Hall, Inc., 1967.

Viollet-le-Duz, E.E. Entretiens, 1863.

Wertheimer, M. Productive thinking. Tavistock, 1959.

Wheatly, P. The pivot of the four corners: A preliminary inquiry into the origins and character of the ancient chinese city. Chicago: Aldine, 1971.

Wiley, D.E. and Harnishfeger, A. Explosion of a myth: Quantity of schooling and exposure to instruction, major educational vehicles. Educational Researcher, 1974, 3, 7-12.

Wortmen, P.M. Medical diagnosis: An information-processing approach. Computers and Biomedical Research, 1972, 5, 315-328.

Zahorik, J.A. The effect of planning on teaching. Elementary School Journal, 1970, 71, 143-151.

Zahorik, J.A. Teachers' planning models. Paper presented at the annual meeting of the American Educational Research Association, Washington, D.C., April, 1975.

Zetterberg, H.L. On theory and verification in sociology. Totowa, N.J.: Bedminster Press, 1965.